Wireless Routers

Mobile Router
GPRS / EDGE

Broadband Router
UMTS HSDPA / HSUPA

MULTENET Wireless Routers

User Manual

English
Version 1.0
March 2008

Document Scope

This manual describes how to install, configure and operate the Multenet Wireless Routers. For updated product features, refer to our website at www.multenet.com

Revision History

Revision No	Changes
1.0	First release

Data, Illustrations, Alterations

The data and illustrations found in this document are not binding. We reserve the right to modify our products in line with our policy of continuous product development. The information in this document is subject to change without notice and should not be construed as a commitment by Multenet.

Multenet assumes no responsibility for any errors that may appear in this document. If you have any suggestions for improvement or amendment, or have found errors in this publication, please notify us through your distributor or email techsupport@multenet.com

Trademarks

EtherPAD and PocketPAD are registered Trademarks of Multenet. Internet Explorer, Windows 95/98/2000/NT/XP are registered trademarks of Microsoft Corporation. Ethernet is a trademark of XEROX Corporation. Modbus is a trademark of Schneider Electric, Inc.

Copyright 2008 Multenet **All rights reserved.**

Contact details:

Multenet Technologies (Pty) Ltd.
P O Box 7155, Stellenbosch, 7599
The Vineyard Centre, Adam Tas Road,
Stellenbosch, 7600

Sales Email : sales@multenet.com
Technical Support Email : techsupport@multenet.com
Website : http://www.multenet.com

Contents

INTRODUCTION 6

Introduction to the Wireless Routers 7
- Wireless Connectivity 7
  - GPRS 7
  - EDGE 7
  - UMTS HSDPA 7
  - HSUPA 7
- Wireless Routers 7
  - Mobile Router 7
  - Broadband Router 7
- Product Features 8

Security 9

Firmware Updates 9

GETTING STARTED 10
- Inserting SIM cards 11
- Attaching the Antenna 11
- 10/100 Base-T Ethernet Network Connection 12
- Serial Port Connection 12

Configuration of the Wireless Router 12
- Discovering Multenet Devices 12

CONFIGURATION 15

Configuration Overview 16

Web Browser Configuration 17
- Requirements 17
- Check your web browser proxy settings 17
- Open Web configuration 17
- Log into Web Configuration 17
  - Home 18
  - Management 19
    - Security 19
    - System Information 19
    - Date and Time 19
    - Mobile 21
  - Networking 22
    - Ethernet Parameters 22
    - PPP (Point-to-Point Tunnelling Protocol) 23
    - Routing 31
    - VPN 32
    - DNS (Domain Name Server) 34
    - SNMP (Simple Network Management Protocol) 34
    - Port Forwarding 35
    - DHCP 36

Firewalling 36
Serial 38
Port Settings 38
Applications 40
Configuration File Upload 46

Monitoring and Support
47
Monitoring 48
PPP Connection 48
Routing Table 50
Firewall Log 51
Example of Firewall Log 51
DHCP Server Log 51
Connection List 52
Mobile Network 52
Support 54
Config Info 54
Config File 55
System Log 56
Contact Us 57
Tools 58
Ping 58
Traceroute 58
SMS Services 59

UPGRADING

Firmware upgrade 61

TROUBLESHOOTING
62
Verifying MAC Addresses 62
Ping 63
ARP 63
Traceroute 63
Telnet 64
Web Browser Proxy Settings 64
Recovering from a Lost Password 66
System 67
Serial Interface 67
Network Interface - 10/100 Base-T 67
GSM 67
Mobile Network 68

APPENDIX **69**

Interface Pin-outs **71**
Network Interface 71
Serial Interface 71
RS-422 Serial Interface Pin-out **72**
Cables **73**
Crossed Serial Cable 73
Full Crossed Serial Cable 73
Null-Modem Crossed Serial Cable 74
Straight Serial Cable 74

NOTES **75**

INTRODUCTION

The chapter provides information on functionality and provides an overview of wireless communication technologies.

Introduction to the Wireless Routers

Wireless Connectivity

To determine which wireless technology is best suited for your application, the following guideline will give you some indication of the differences in these technologies.

GPRS

GPRS is a basic low speed GSM data service offered by most GSM operators. It has a basic upload speed of 11kb/s and a download speed of around 44kb/s. Although GPRS is very reliable and almost universally available where GSM exists, it has a major drawback of relatively long latency times with an average latency of around 700 – 900mS. GPRS is ideal for telemetry applications (meter reading, remote monitoring of devices etc.) or low speed transaction based systems such as ATM's but it is unsuitable for video links.

EDGE

EDGE is an enhancement to GPRS which is effectively four times the speed in both the upload and download directions (i.e. 176Kb/s down and 44kb/s up). It is however not as widely available as GPRS, but is capable of providing low to medium grade streaming video due to the higher bandwidth and lower latency.

UMTS HSDPA

HSDPA is an advanced technology which provides very high speed wireless mobile data. Current speeds are 7.2Mb/s in the download direction depending on the network's capabilities. Because of the above, HSDPA is ideal for almost all applications which need reliable, high speed networking. Applications include remote signage high quality CCTV and provision of internet access to areas with no access to wired services.

HSUPA

HSUPA is the latest release of high speed wireless network which offers significantly improved uplink speeds as denoted by the 'U' in the name. Uplink intensive applications such as CCTV will benefit considerably from this technology.

Wireless Routers

Mobile Router

The Mobile Router is capable of connecting to GSM/GPRS/EDGE networks. Typical applications are where reliability is important, but high speed is not a priority such as ATM machines, credit cards authorizations and telemetry.

Broadband Router

The Broadband Router is capable of connecting to UMTS HSDPA / HSUPA networks. Typical applications include remote office connectivity and CCTV video streaming.

Product Features

The **Wireless Routers** have one RS-232/422/485 Serial interfaces, a integrated EDGE or HSDPA modem depending on model, dual SIM slots and a single 10/100 Base-T Ethernet interface.

A Wireless Router is capable of connecting a number of Ethernet devices via GSM/GPRS/ EDGE networks on the Mobile Router, or UMTS/HSDPA networks on the Broadband Router. With always–on and DUAL SIM card technology they provide easy to deploy access to central servers and the Internet via GSM networks. The Wireless Routers are capable of maintaining a permanent PPP connection or alternatively making a connection on demand (dial-on-demand) to the distant network. It also allows you to dial into an Ethernet network to access devices on that network or dial out of an Ethernet network to connect to a remote RAS server.

Some of the features supported by the Wireless Routers are:

IP Masquerading, which allows one or more computers in a network without assigned IP addresses to communicate with the Internet.

Port Forwarding, (sometimes referred to as tunnelling) which is the act of forwarding a network port from one network node to another, can also be enabled.

The Firewall feature on the Wireless Routers allow you to implement security by setting up Access Control rules. The Firewall feature allows you to control your connection denying any unwanted traffic or simply viewing what traffic is passing through the Wireless Routers.

Another feature on the Wireless Routers is a DHCP server to dynamically allocate IP Addresses to hosts connected to the Ethernet network.

VPN functionality is standard on the Wireless Routers, providing reliable and secure communication between the Router and your corporate network.

Security

Securing your Wireless Router is done on various levels. Authentication is required for configuring the Wireless Routers. The administrator username is 'root' with the default password being 'xxx'. It is recommended that you change this password to protect against unwanted configuration changes on the Router.

NOTE: **DO NOT lose your password.** If both the Bootloader and System passwords are lost, you will need to send your Wireless Router back to Multenet to be reprogrammed. There is a cost associated with this recovery procedure. You are able to recover from a lost System password by erasing the Dataflash using the Bootloader login. The firmware will then need to be uploaded via serial.

Firmware Updates

Multenet continues to develop its products extensively, with new firmware releases available regularly. New releases may contain new protocols, new features, bug fixes, performance improvements, etc.

These firmware updates can be downloaded from the Multenet website:

http://www.multenet.com/support/downloads.html

Alternatively, contact your local distributor or email Technical Support.

Firmware can be uploaded to the Wireless Routers via EtherPAD Explorer V1.5.2 and above (included on CD).

GETTING STARTED

This chapter provides information on connecting your Wireless Router to the network. The Wireless Routers operate on the GSM network and it is important to take signal strenth and quality into account when installing these devices.

Inserting SIM cards

The Wireless Routers support Dual-SIM so that a second service provider can be used as a backup should your primary service provider become unavailable.

On the front of the Wireless Routers, there are two SIM slots in which the SIM cards are inserted. SIM slot 1 should be used for your primary service provider, and SIM 2 for the secondary or backup operator. To insert the SIM cards, insert the SIM into the drawer which is ejected by depressing the release button next to the SIM drawer. Ensure that the trays are fully inserted before starting up the router. For a single SIM configuration the SIM1 slot should be used.

Note: Your Subscriber Identity Module (SIM) card is not included and must be obtained from your local Cellular Service Provider.

A data enabled SIM card is required for operation of the Multenet Wireless Routers.

Attaching the Antenna

Antennas are supplied with Multenet's range of wireless routers.

Attach the antenna to the connector on the front of the Wireless Router and fasten by turning.

In some cases, a combination of factors can mean that a suitable signal can only be obtained by the use of additional optional antennas.

These issues include:
a. If the unit is inside a metal enclosure such as a DIN rail cabinet
b. Proximity to interference generating equipment such as large machinery
c. Distance from the nearest cell site
d. Shielding by concrete reinforcement (e.g. within a large shopping mall)

In these cases, contact Multenet to obtain information on installing aditional antennas.

10/100 Base-T Ethernet Network Connection

Connect to your router via the Ethernet Network through a 10/100 Base-T switch/hub or directly via straight or crossover Ethernet cable.

Serial Port Connection

The Router is a DTE (Data Terminal Equipment) device. You need to choose the serial cable best suited to your serial device. A number of cable options are available:

- Crossed Serial Cable (most commonly used).
- Full Crossed Serial Cable.
- Null-Modem Crossed Serial Cable. Connect to another DTE (Data Terminal Equipment) device, such as a PC.
- Straight Serial Cable. Connect to a DCE (Data Communications Equipment) device such as a Modem.

Configuration of the Wireless Router

There are a number of methods to configure the Router:

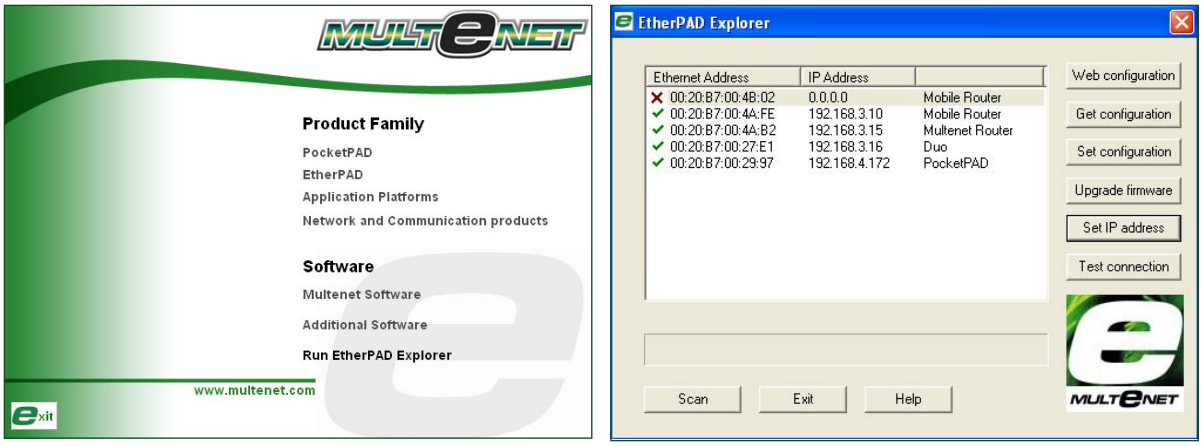
- Web Browser Configuration
- Configuration File Upload
- Telnet or Serial configuration
- BootP/DHCP

These configuration methods will be explained in the next chapter.

Discovering Multenet Devices

Please ensure that your system firewall is disabled, launch EtherPAD Explorer and click on 'Scan' to discover any Multenet devices on your local subnet.
or
Select [**Run EtherPAD Explorer now**] from the Autorun Menu to launch the executable from the CD, then click on scan to start discovery.

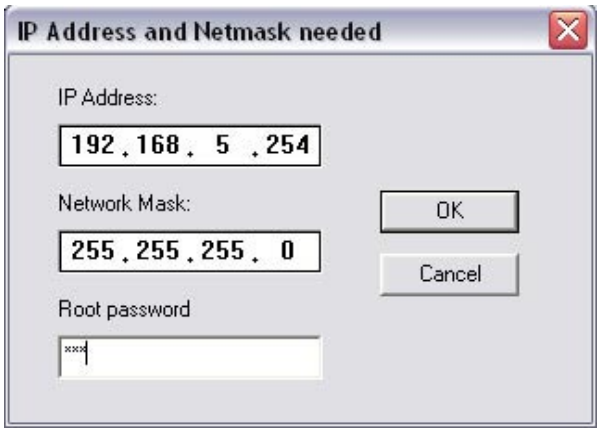
Note: EtherPAD Explorer executable is available on the Multenet Product CD, along with the installation for MS Windows PCs

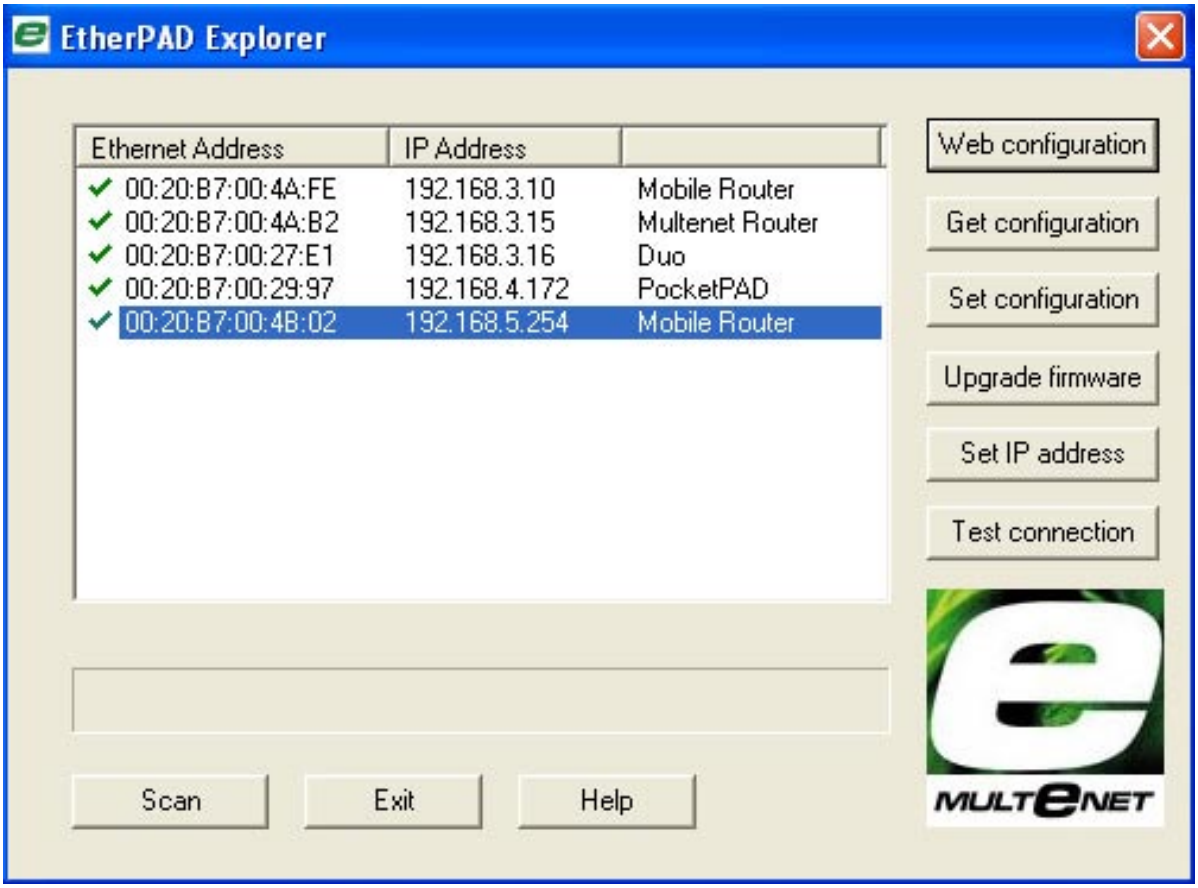


Click [**Scan**] in EtherPAD Explorer to find Wireless Routers and other Multenet products on the local Ethernet segment. A broadcast is sent out to which Multenet products respond to. A new device will have no IP Address set, unless a DHCP server is setup and has issued the Router an IP Address. Identify the MAC Address on the Router to verify that the unit is online. Multenet devices on remote segments and networks will not be seen by EtherPAD Explorer as routers will block the broadcast.

You will need to [**Set IP Address**] to configure the Router via TCP/IP. Make sure the IP Address falls in your local subnet. Ask your Network Administrator should you have issues getting these details.

The default Root password is '**xxx**'. If an IP Address has already been set, it may be that the DHCP server has assigned the network parameters. The Router, by default, is set to obtain an IP Address from a DHCP server.





You can [**Test connection**] to check if the Router is reachable via TCP/IP. If the test fails, check your IP Address and Subnet Mask settings.

Check that the IP Address you enter is not used by another host on the network. Duplicate IP Addresses may cause unwanted network disruptions. Check the Troubleshooting Guide for more fault-finding tips.

CONFIGURATION

This chapter provides information on configuring your Wireless Router.

Configuration Overview

There are a number of methods to configure the Router:

- Web Browser Configuration via network using a Web Browser.
- Configuration File Upload via network using EtherPAD Explorer.
- Telnet or Serial configuration via network using a terminal application.
- DHCP/BootP with TFTP automatically via network servers.

Three steps are required to configure the Router for operation:

1. Configure the Router's IP Address, Network Mask and Gateway IP Address.
2. Configure PPP to connect to your service provider.
3. Configure the Serial communication parameters. (Optional)

Web Browser Configuration

Requirements

- Ethernet connection. A computer with an Ethernet port or a Local Area Network (LAN).
- A web browser such as the Internet Explorer or FireFox installed on your PC.

Check your web browser proxy settings

If your web browser is configured to use a proxy server, you may have problems connecting to the configuration pages on your Router. In this case, disable the proxy server in your browser.

Open Web configuration

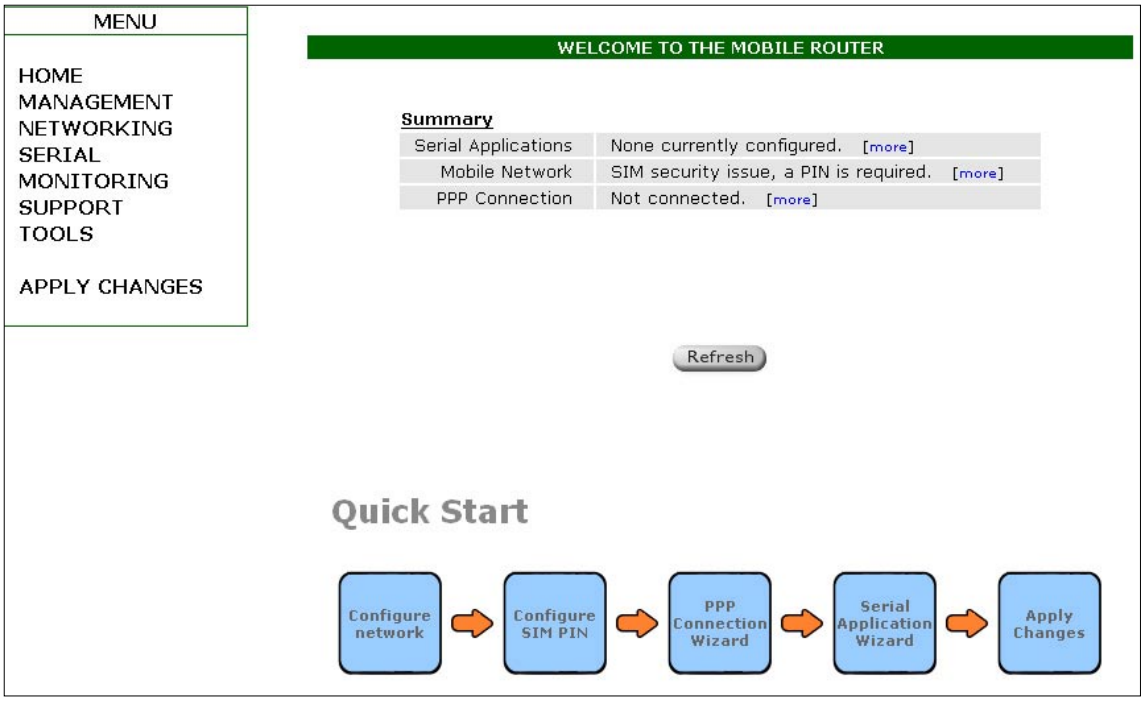
Select your Wireless Router in EtherPAD Explorer and click [**Web configuration**] to launch your Web Browser.

Log into Web Configuration

Log into the Router ('**root**' with default password '**xxx**') by clicking [**Enter Configuration**].

Home

Logging in displays the home page.



Home Page Menu

Summary

Summary displays useful information, and allows quick access to options such as configured Serial Applications, Mobile Network status and PPP connection status and configuration.

Quick Start

The quickstart tabs are designed as a guideline to enable fast configuration of the Wireless Router, using a structured approach and by utilizing configuration wizards for the setup of the network configuration, SIM PIN, PPP and serial applications.
This is the recommended approach for setting up the Wireless Router.

Navigation

Use the Navigation Bar on the left hand side of the page to navigate through the configuration options of the Wireless Router. This manual will describe the different configuration options to you by order of the navigation menu.

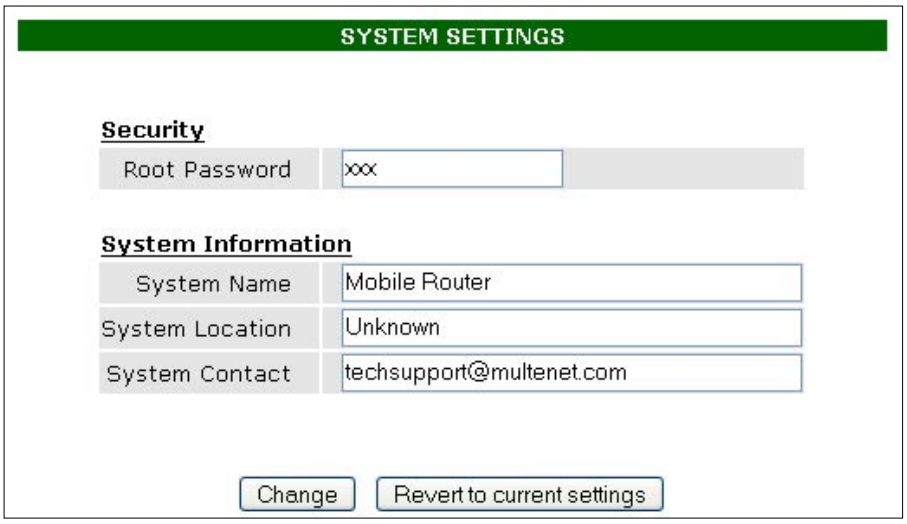
Apply Changes and Save/Reboot

Once you have made configuration changes, you will need to click on 'Apply Changes' on the navigation bar which will take you to the 'Save and Reboot' screen.

Reboot with new settings	-	Your changes will be saved and implemented after reboot.
Reboot with old settings	-	Cancel your changes and reboot with the old configuration.
Reboot with factory default settings	-	Remove all changes made (old & new). The Router boots with the original default settings.

Management

Management Settings provides options to change the Root password, and various device specific parameters.



Security

The administrator username is 'root' with a default password being 'xxx'. It is recommended to change the password before deployment.

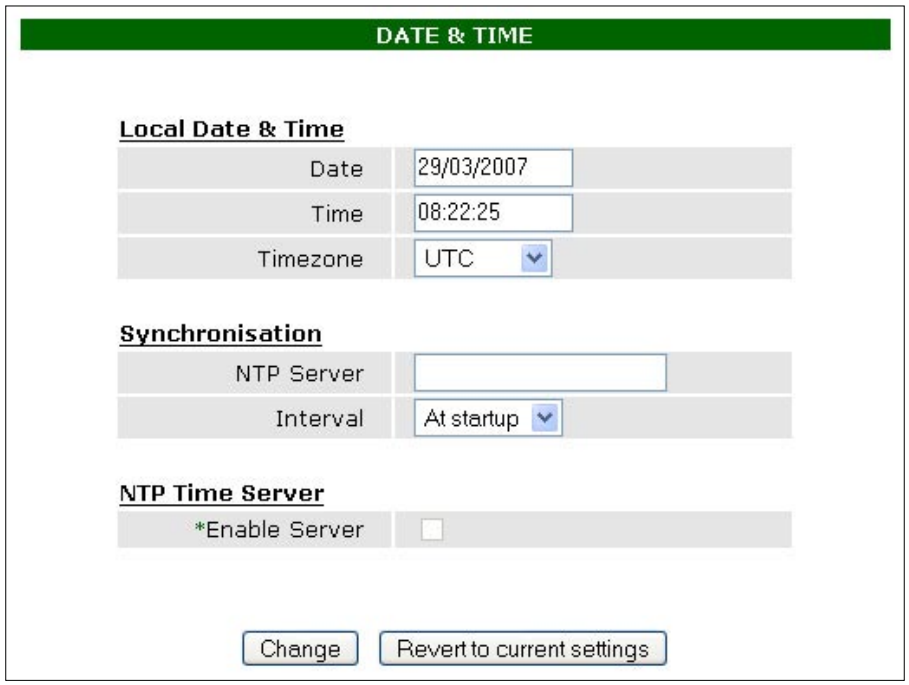
DO NOT lose your password. If you have lost a password, check 'Recovering from a lost password' in the Troubleshooting chapter.

System Information

System Name - Identify your Router with this label. Handy if you have many devices on the local network.
System Location - Set a Location name label for your device.
System Contact - Enter a contact for this Router (e-mail, name, telephone number)

Date and Time

Date and Time provides options to change the date and time, and to configure the Router's NTP server settings. For this device to be used as a NTP time server, you need to first configure a NTP server for this device to synchronise with.



Local Date and Time

Date	-	Date should be entered in the format dd/mm/yyyy.
Time	-	24h mode time.
Timezone	-	Select your Coordinated Universal Time (UTC).

Synchronisation

NTP Server	-	Enter the address of the NTP server you would like to synchronize with. Network Time Protocol (NTP) provides a solution for the need to synchronize network devices to an accurate time in a networking environment. An NTP client synchronizes the time and date with an NTP server. The NTP server should be a reliable source, such as a time server on the Internet. A number of free public Internet time servers are available.
Interval	-	Select the interval at which you would like the Wireless Router to synchronise with the NTP time server.

NTP Time Server

Enable Server	-	Check this box to set up the Wireless Router to act as a NTP server. This would enable local time synchronisation for your devices with the Wireless Router.

Note:
For a list of public NTP servers go to www.ntp.org.
You should select the server closest to your location.

Mobile

Mobile settings allow the configuration of SIM security and network fail-over options.

Security

SIM PIN - If configured, enter SIM PIN(s) here.

SMS Service Provider

SIM SC Number - Enter the Message Centre Number(s) of you service provider. This is needed to send SMS messages and SMS Status reports in the 'Tools' Menu.

Backup Recovery

The Wireless Router allows you to configure network failover from SIM1 to SIM2. If configured, the Wireless Router will connect to a secondary or backup service provider should the service on SIM1 become unavailable. A retry-delay can be set for when the service on SIM1 becomes available.

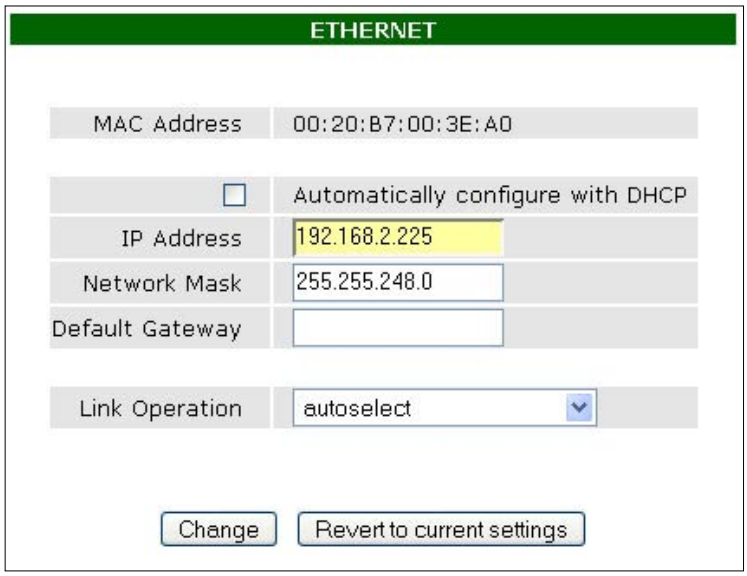
Swap SIMS - To activate the Network Fail-over option, check this box.

Retry delay - The amount of time in minutes the Router should wait before trying to switch to the primary (SIM1) network. A value of zero will result in the Router only switching back to the alternate SIM when the current network connection fails.

Networking

Network Settings provides for configuring the Ethernet parameters of the Wireless Router.

Ethernet Parameters



Clicking on 'Ethernet' or by selecting 'Configure Network' from the quickstart will open the Ethernet configuration. The Ethernet Parameters allows you to set the IP Address, Subnet Mask and Default Gateway. Once a static IP address is configured, the 'Automatically configure DHCP' checkbox will be un-checked. Check the box to re-enable DHCP configuration. The Gateway can also be set here (all traffic not recognised for the local subnet will be forwarded to the Gateway IP Address).

Note:
If a Default Gateway is configured, a Default Route will automatically be created which can be viewed and modified from the Routing section later in this chapter.

PPP (Point-to-Point Tunnelling Protocol)

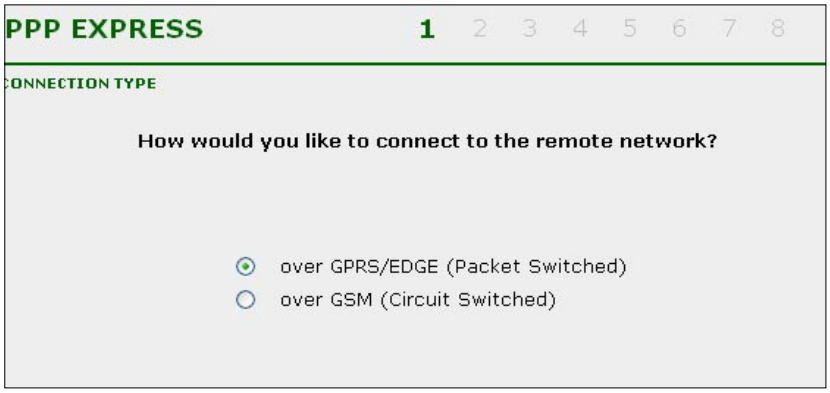
There are two methods available for setting up PPP on the Wireless Router.

PPP Express	-	Wizard based setup to help you set up the PPP connection. (Recommended)
Manual	-	Manual configuration for setting up a PPP connection.

PPP Express

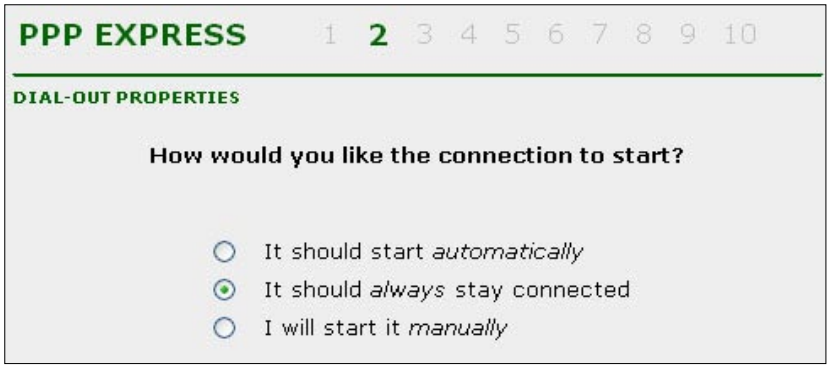
Launch the PPP Express Setup Wizard, by clicking on the 'PPP Express' link. This will launch the wizard in a separate browser window as indicated below. The wizard will guide you through setting up a connection. Depending on your environment, you will have the option of clicking through and in most cases use the default assigned values. The following steps below show how to set up a Always-On wireless connection.

1. Connection Type


PPP EXPRESS
1 2 3 4 5 6 7 8
CONNECTION TYPE
How would you like to connect to the remote network?
over GPRS/EDGE (Packet Switched)
over GSM (Circuit Switched)

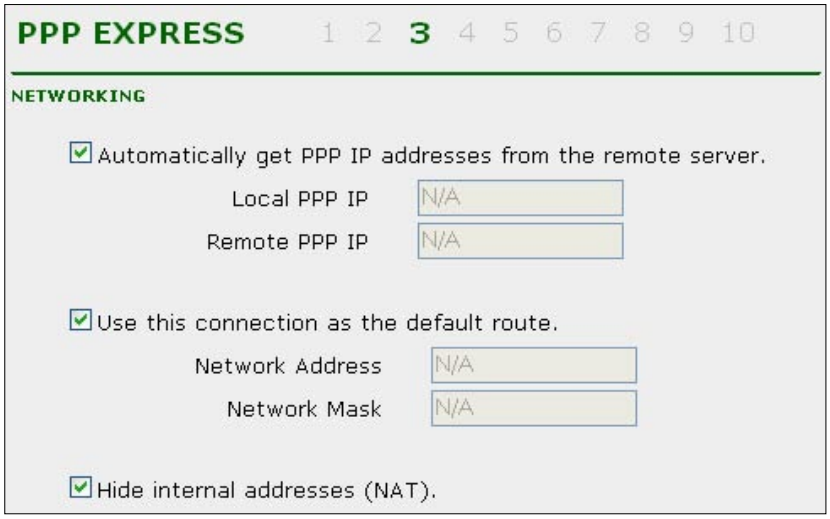
You have the option for selecting either GPRS/EDGE, also used for HSDPA (Packet Switched), or GSM (Circuit Switched) for connecting to the remote network.

2.Dial-out Properties


PPP EXPRESS
1 2 3 4 5 6 7 8 9 10
DIAL-OUT PROPERTIES
How would you like the connection to start?
It should start automatically
It should always stay connected
I will start it manually

Three options are available to choose from: ‘It should start automatically’ for dial-on demand, ‘Always stay connected’ for a connection that will be permanently connected or ‘I will start it manually’ in the case you want to manually control your connection. Select ‘Always stay connected’ and click ‘Next’

3.Networking

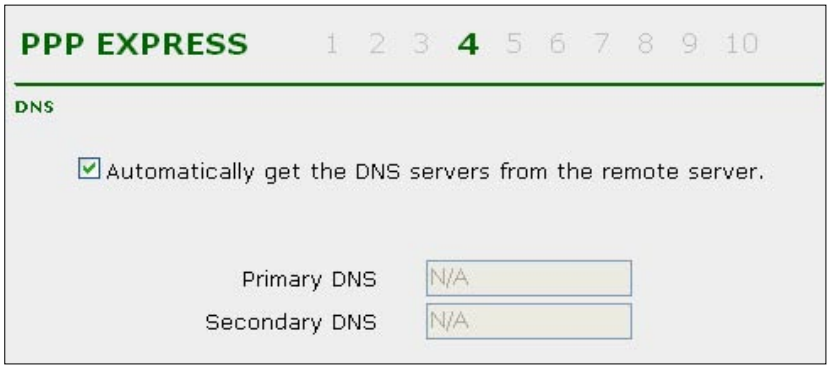


PPP IP Addresses
To automatically get PPP IP addresses from the remote server, leave this option checked. (Recommended). The PPP IP addresses are the IP Addresses used by the Router and the remote server to associate with the PPP connection. Usually the remote dial-in server will provide the IP Addresses to use.

Default Route
To use this connection as the default route, leave this option checked. (Recommended) Enabling the default route option means that all packets not intended for the LAN will be forwarded over the PPP connection. If the PPP connection is to the Internet then you should enable this option. Otherwise change the network address and netmask mask fields to configure exactly which network is on the other side of the PPP connection.

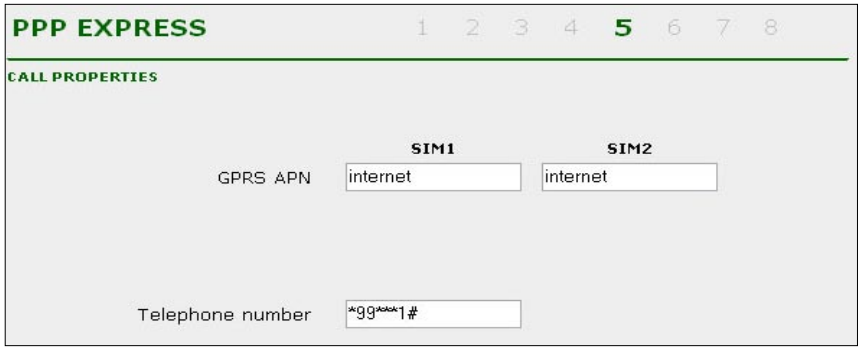
NAT
To hide the internal addresses, leave this option checked. (Recommended)
This is also known as Masquerading. All packets going through the Router over the PPP connection will seem as if they originated from the Router itself. Masquerading is also used for added security between the LAN and the PPP connection.

4.DNS



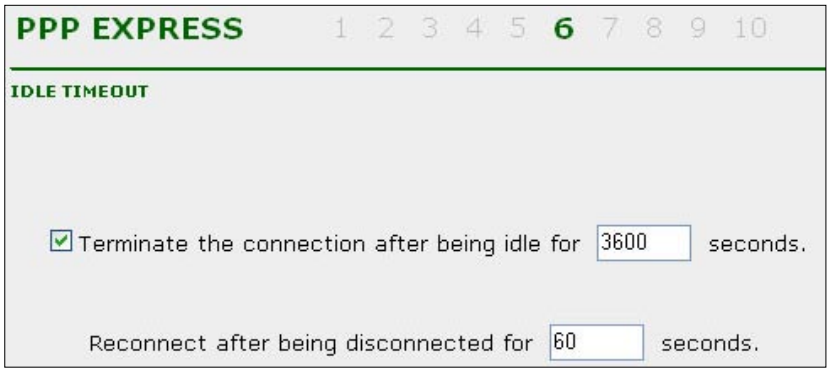
To automatically get the DNS servers from the remote server, leave this option checked. Domain name servers are used to translate domain names (e.g.. multenet.com) to IP addresses. Either use the DNS servers supplied by the remote server (recommended) or manually configure them.

5. Call Properties



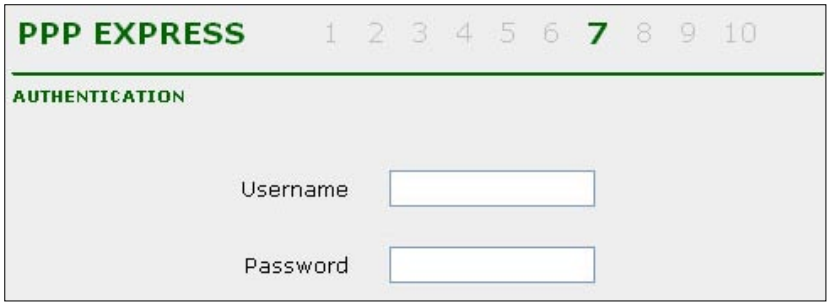
The APN (Access Point Node) is the name of the server you will authenticate with via the wireless connection. This option is only required for GPRS/EDGE/HSDPA connections. For most mobile networks the APN of “internet” can be used to connect to the Internet. Based on your selection in step one, default values will be loaded in the fields for the calling properties. For GPRS/EDGE/HSDPA, no changes need to be made.

6. Idle Timeout



This option will terminate the PPP connection after it has been idle for the configured number of seconds (recommended). If it is an always-on connection, the connection will re-establish itself automatically. Valid timeouts are between 1 and 86400 seconds inclusive.

7. Authentication



The username and password is for authenticating (PAP or CHAP) on the node server and should have been provided by your cellular service provider.

10. Update Configuration

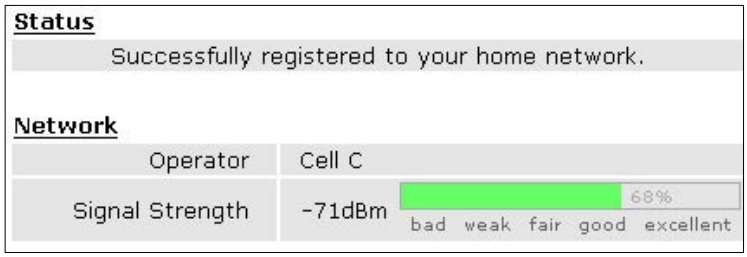
PPP EXPRESS
1 2 3 4 5 6 7 8 9 10
You have now successfully completed the PPP Express setup.
Please click below to update the configuration.
Update Configuration

To complete the setup of your PPP connection, click on ‘Update Configuration’. Take note of the colour change of the ‘Apply Changes’ option in your navigation menu. Your new settings will only become active once you click ‘Apply Changes’ and then ‘Save and Reboot with new Settings’

View configuration.

To view the configuration changes you have made. Click on (Networking -> PPP) in the navigation bar.

Summary of configuration.



Summary as displayed on the Mobile Network page below Monitoring.

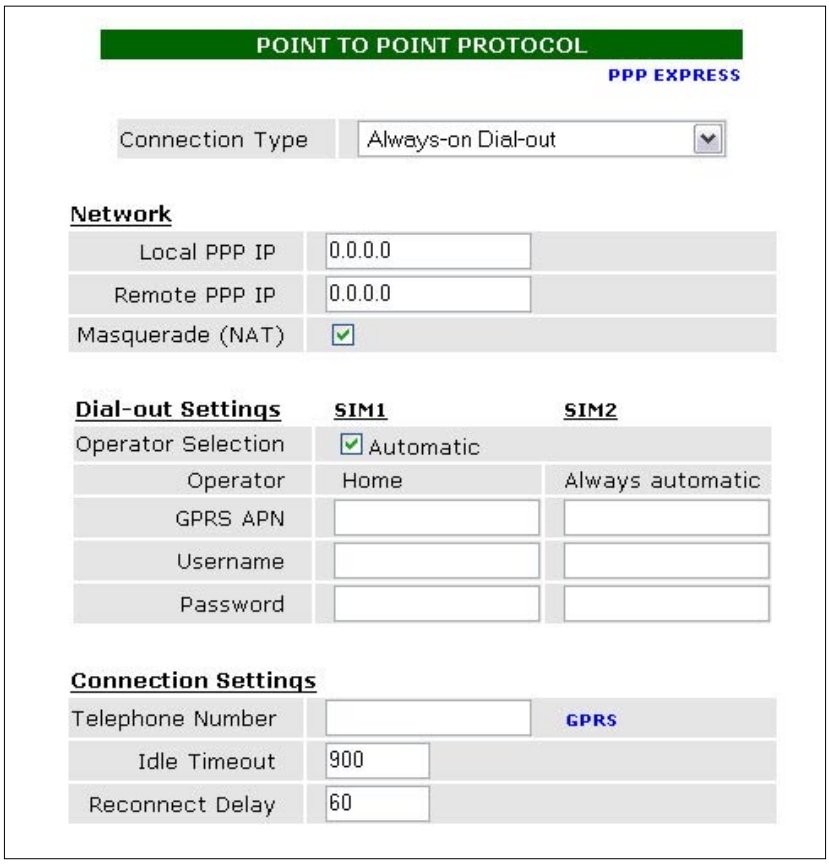
At this point, should the SIM be installed correctly, the PIN configured and the PPP settings configured correctly, a connection could be established. You could view the status of mobile network and the PPP connection in the Monitoring section or by viewing the 'Summary' on the Home Page. Monitoring will be discussed in depth later in this manual.

Summary as displayed on Home Page.

The next section provides information on how to manually configure PPP account parameters, or to edit PPP parameters that was set up using the PPP Expres wizard.

PPP Manual Configuration

PPP Account Parameters overview:



Connection Type

Set the type of connection. Depending on your connection type will determine which fields are available in the PPP configuration.

Offline - The modem will be seen as offline. It will not be used.

Always-on dial-out- Stay connected to a remote PPP device. A Reconnect Delay value is available to offer a pause between dial-up attempts.

On-demand dial-out- Connect to a remote PPP device when necessary.

Dial-in - Allow remote devices to initiate a connection.

Dial-in and dial-out- Dial-out if data is available to send, otherwise wait for an incoming connection.

Manual - Manually control connection state.

Network

Configure PPP networking.

Local PPP IP - Assign a local IP Address to serial interface if remote unit requests this. Usually used when configured as an access server (RAS, dial-in). Default is 0.0.0.0. This default setting indicates that the remote side should assign this value.

Remote PPP IP - Assign a remote IP Address to serial interface if remote unit requests this. Usually used when configured as an access server (RAS, dial-in). Default is 0.0.0.0. This default setting indicates that the remote side should assign this value.

Masquerade - On an outgoing packet, change the source IP Address to that of the Router (SNAT - Source Network Address Translation). Any received packets will have their destination IP Address changed back to the IP Address of the host which originated the connection. This is also used for sharing a single IP Address among a whole network (usually a LAN connected to the Internet with only one IP Address).

Dial out Settings

Set up your dial-out settings for connecting to the GSM network.

Operator Selection- By default, the router automatically negotiates which network operator to select based on information provided by your service provider. To manually select your operator when more than one operator is available, uncheck the Operator Selection checkbox.

Operator - In the case you have opted to select a diffrent operator than the one assigend as your home operator, a drop down list of the available operators will be displayed. ‘Home’ indicates that only a single operator exists.

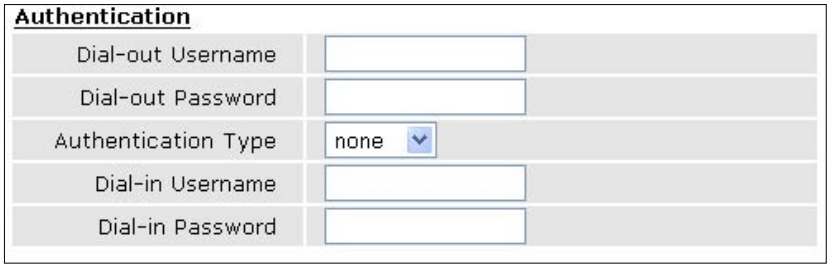
APN - Enter the name of the APN as per your service provider.

Username - Enter your username as per your service provider.

Password - Enter your password as per your service provider.

Authentication

Set the dial-out/dial-in username, password and authentication type. For dial-out accounts, only the 'Username' and 'Password' field is available.



Dial-Out Username- The username of the dial-out account.
Dial-Out Password- The password of the dial-out account.

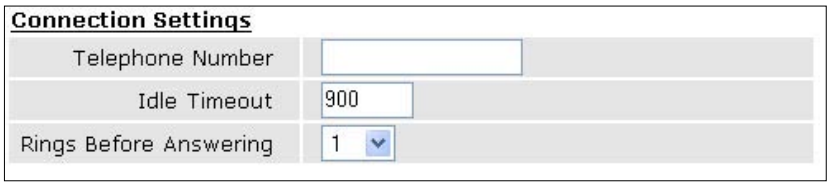
Authentication- For Dial-In accounts only. Two authentication methods are available.

Type If you are setting up a dial-in account, select your authentication protocol.

PAP - Password Authentication Protocol.
CHAP - Challenge-Handshake Authentication Protocol

Connection Settings

Specify the telephone number, Idle Timeout, Reconnect Delay and Rings before answer.



Telephone-number For GSM dial-out accounts, specify the telephone number of the PPP Access Server. For GPRS/EDGE/HSDPA dial-out accounts, enter the value *99***1# in this field.

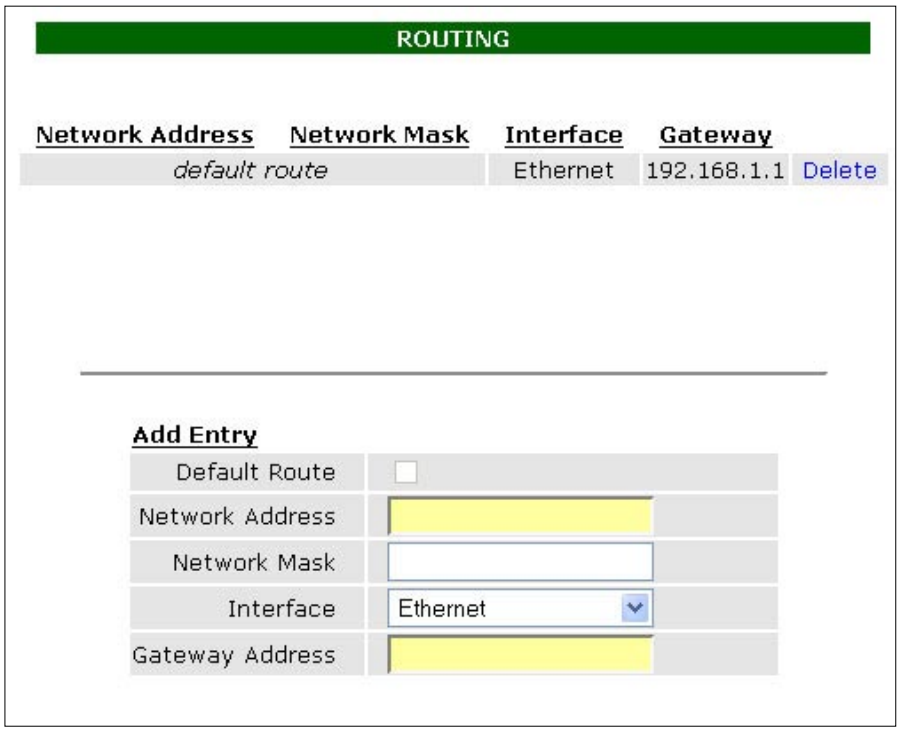
Idle Timeout - Disconnect after idling for this length of time. Default is 600 seconds. This parameter is only applicable with dial-in and manual connections configured. Acceptable values are between (and including) 0 and 86400 seconds (24 hours). A zero (0) setting will disable the timeout feature.

Reconnect-delay Redial if the connection has been disconnected for this length of time. Only applicable to Always-on connections.

Rings - Answer incoming calls after this amount of rings on dial-in accounts (GSM only).

Routing

Routing provides a tool to create static routes to different networks. If a Ethernet default gateway is set, the following default route is seen.



Default Route - To create a default route over Ethernet, PPP or VPN this box must be checked

Network Address - Specify the remote network's address. This will create an IP route to the remote network.

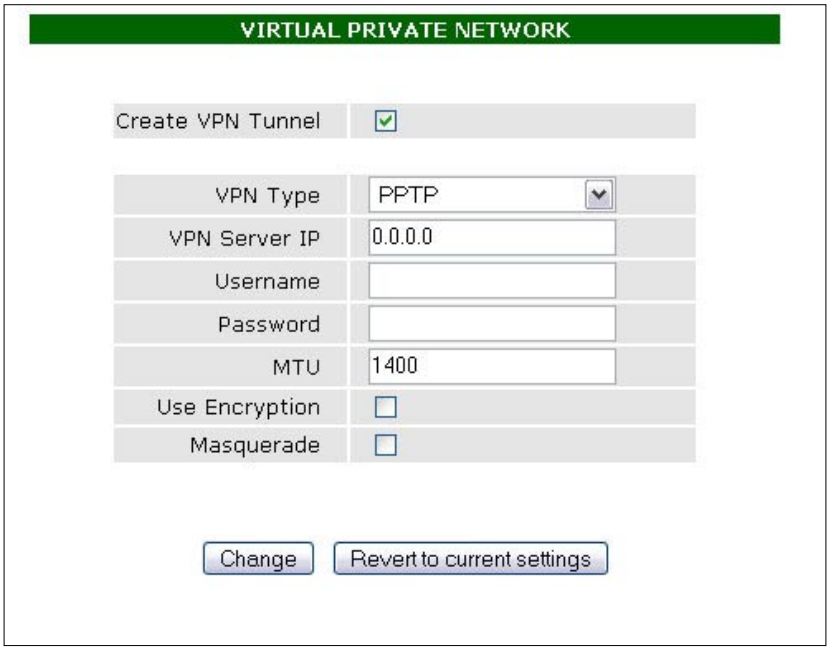
Network Mask - Specify the remote network's mask. This parameter is only used for non-default routes.

Interface - Select the interface for which this route applies in the drop-down list.

Gateway address- Specify the IP address of the gateway for this route.

VPN

A Virtual Private Network (or VPN) allows you join two private networks that are separated by the Internet or other publicly accessible network. The two end points of this “network” are private networks that are seamlessly connected across a public network creating a “Virtual Private Network” between them.



To set up a VPN to a remote network, check the ‘Create VPN Tunnel’ checkbox.

VPN Type

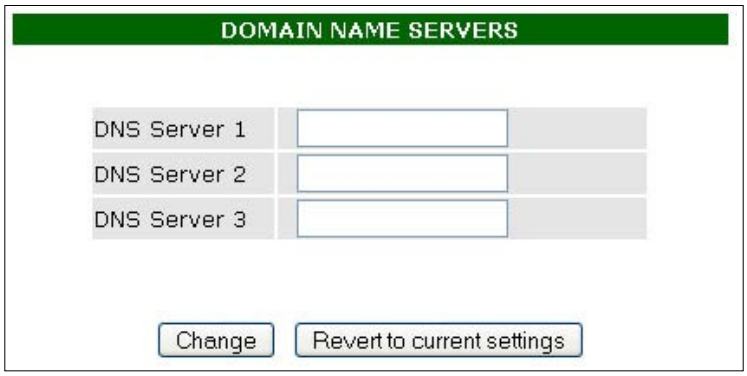
The Wireless Routers supports two types of VPN Tunnelling:

PPTP	Point-to-Point Tunnelling Protocol (PPTP) is a protocol that allows for extending networks through private “tunnels” over the public Internet.
L2TP	Layer Two Tunnelling Protocol (L2TP) is a protocol that allows for extending networks through unsecured “tunnels” over the public internet.
VPN Server IP	Enter the public IP Address of your remote VPN server.
Username	Enter your VPN account’s username.
Password	Enter your VPN account’s password.
MTU	You may need to in some cases change the Maximum Transmission Unit (MTU) size for the VPN connection. In most cases, this can be left at default.
Use Encryption	In the case that you are setting up a PPTP connection, check this box to enable encryption. The Wireless Router supports 40bit and 128bit encryption. If you are connecting over L2TP, encryption is currently not supported.

Note: VPN Routing
Once you have completed the configuration for your VPN server, you will need to set up a route to the network of the VPN server in the ‘Routing’ configuration page. If you wish to configure the Router to use the VPN as a Default Route, you will also be able to set this up on the Routing page.

Note:
When terminating a L2TP VPN on a Microsoft server, IPSec will need to be disabled. Please read the Microsoft Knowledge base article for instructions on disabling IPSec.
http://support.microsoft.com/kb/310109

DNS (Domain Name Server)



Domain Name Server IP Addresses can be configured here if you wish to use hostnames instead of IP Addresses, you can use Hostnames (i.e. demo.multenet.com). The DNS must be reachable for this feature to work successfully. The Gateway IP Address needs to be set if the Domain Name Servers are located outside the local subnet.

SNMP (Simple Network Management Protocol)

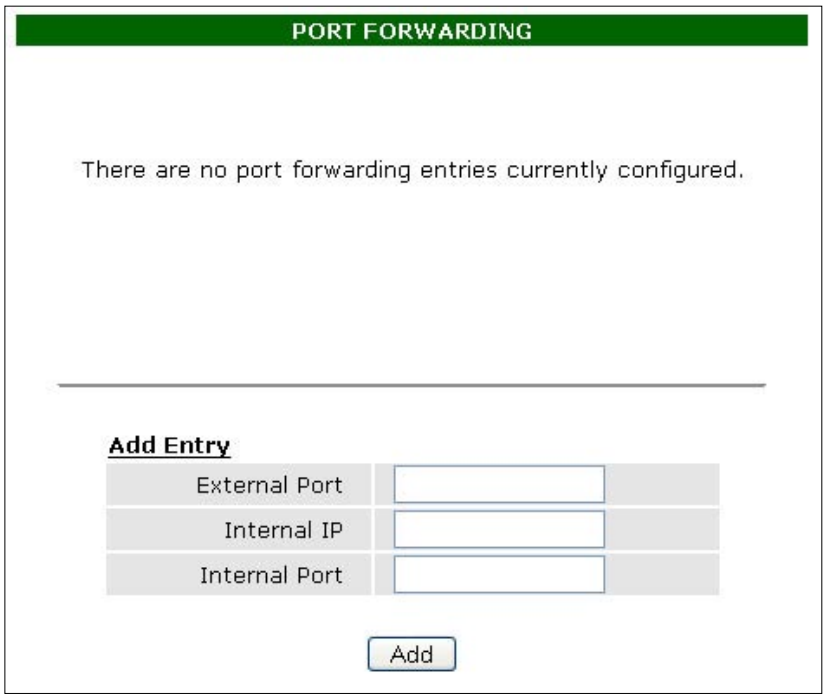
SNMP allows you to monitor the Wireless Router from a SNMP manager. By default, the SNMP MIB can be read by any manager on the Ethernet network.

You can configure the passwords for SNMP access. Default password for Read-Only access is '**public**'.

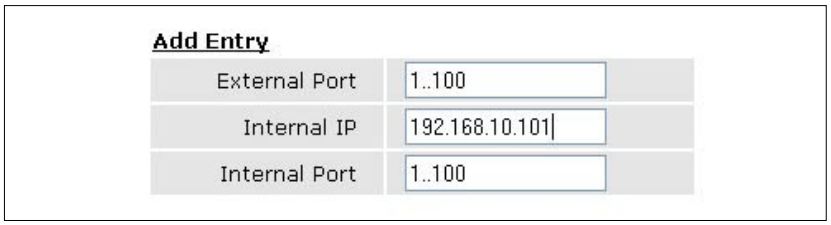
Manager Address	-	IP Address of the SNMP Manager. To allow connection, from any SNMP Manager, specify 255.255.255.255.	
Community String	-	password to access the SNMP MIB.	
Permission	-	read only	Managers can only read values
		read/write	Managers can also write to MIB variables.
Traps	-	disabled	No traps to be sent to SNMP Managers
		snmp v1	v1 type SNMP traps to be sent to configured Manager
		snmp v2c	v2c type SNMP traps to be sent to configured Manager

Port Forwarding

Port Fowarding is used to implement Port Address Translation (PAT). An incoming connection to the Wireless Router's PPP IP Address and a specific port will be forwarded to an internal host and port.

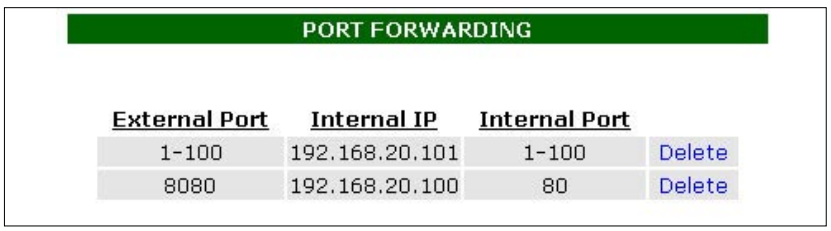


Port Forwarding is usually used in conjunction with Masquerading.



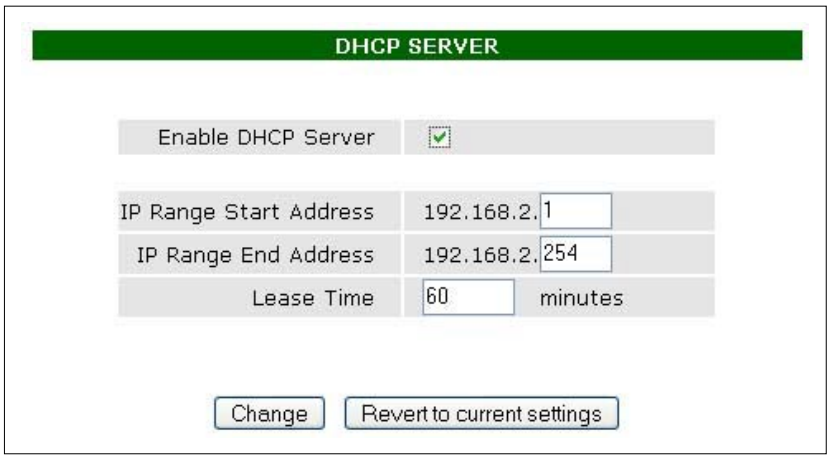
Note:
A range of ports can be specified using two dots "..".

The example below shows that port 1 to 100 are redirected to port 1 to 100 on IP address 192.168.20.101, while port 8080 is redirected to IP address 192.168.20.100 port 80 (HTTP)



DHCP

DHCP allows you to assign IP Addresses to hosts connecting to your LAN, which don't have IP Addresses and have a DHCP client enabled.



To set up the Wireless Router as a DHCP server, check the 'Enable DHCP Server' box. Once enabled, you will have the option of configuring the range and the lease time. You will only be able to specify a range within your current network. Valid lease time is between 5 and 1440 minutes (1 day) inclusively.

Firewalling

Firewalling allows you to restrict traffic entering or leaving your network. Rules are applied to incoming and outgoing packets and the packet will be forwarded if is satisfies all the rules.

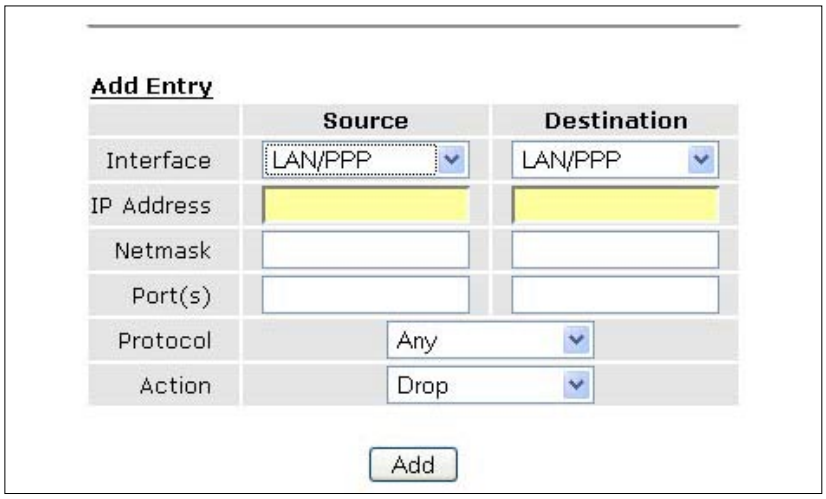
You can enter a maximum 25 Firewall rules on the Wireless Router.

In the example below, the first line states that TCP packets received on any PPP Interface with a destination on the LAN on port 5000 will be allowed through.
The second line states that all other traffic is denied.
If the first line applies, the rest of the rules are skipped. If the rule is for logging, the following rules in the list will be evaluated.

FIREWALL

Rule	Source	Destination	Protocol	Action
1	PPP → anywhere : any	LAN → anywhere : 5000	TCP	Accept
2	LAN/PPP → anywhere : any	LAN/PPP → anywhere : any	TCP	Deny

The default rule is to accept all packets through the Router, allowing all packets unrestricted access through the Router. Should a VPN be configured, any firewall rules attaining to the PPP interface will apply also to the VPN interface.



Rules can match packets based on any combination of:
- Source interface
- Source IP (and Network mask)
- Source port
- Destination interface
- Destination IP (and Network mask)
- Destination port
- Protocol

For each rule you have the option of any one of the following actions.

(i) Drop	Packets matching this rule are discarded and will not continue through the Router.
(ii) Deny	If the rule matches the packet, discard the packet and send an ICMP error
(iii) Accept	Packets matching Accept rules are accepted and are passed through the router.
(iv) Log	Record this packet in the Firewall Log. The next rule is evaluated.

Firewall Rule Order

The order in which rules are compared against the packets entering the firewall are rule 1 first, then rule 2, then rule 3, and so forth (up to a maximum of 25 rules). If a packet does not match any rule in the list, the packet will be accepted and allowed through. The packet will also be allowed through if it matches an ‘Accept’ rule.

New rules that are configured are added to the end of the list. It will be checked last in the rule order.

Use the “move” link to change the position of the rule. Enter the new position you would like the rule to be placed at.

Serial

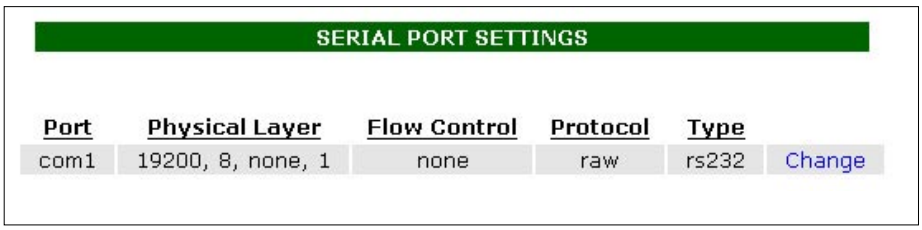
There are two methods available for setting up Serial on the Wireless Routers.

Serial Express	-	Wizard based setup to help you set up Serial.
Manual	-	Manual configuration.

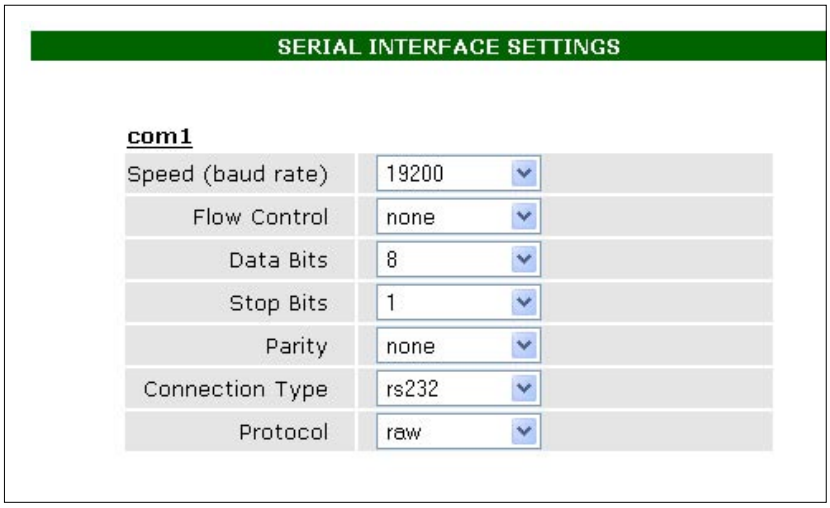
See the next section for setting up a serial application. If you wish to edit your existing Serial Port Settings, opening 'Port Settings' will display the information below.

Port Settings

Configuring the Serial Interface Settings according to the specifications of the manufacturer of your serial device.



To change any of the currently configured serial interface settings, click on 'Change'



Speed	-	Baud rate. Default is 19200 bits per second. Maximum is 230400.
Flow Control	-	Type of handshaking. Default is None. Other supported types are Hardware (RTS/CTS) and Software (Xon/Xoff).
Data Bits	-	Number of Data Bits. Default is 8.
Stop Bits	-	Number of Stop Bits. Default is 1.
Parity	-	Data Integrity method. Default is None. Other supported types are Odd, Even, Mark, and Space.
Connection Type	-	Default is RS-232.

RS-232 - connect a RS-232 cable to the Serial interface.
RS-422 - connect a RS-422 cable to the Serial interface.
RS-485 - connect a RS-485 cable to the Serial interface.

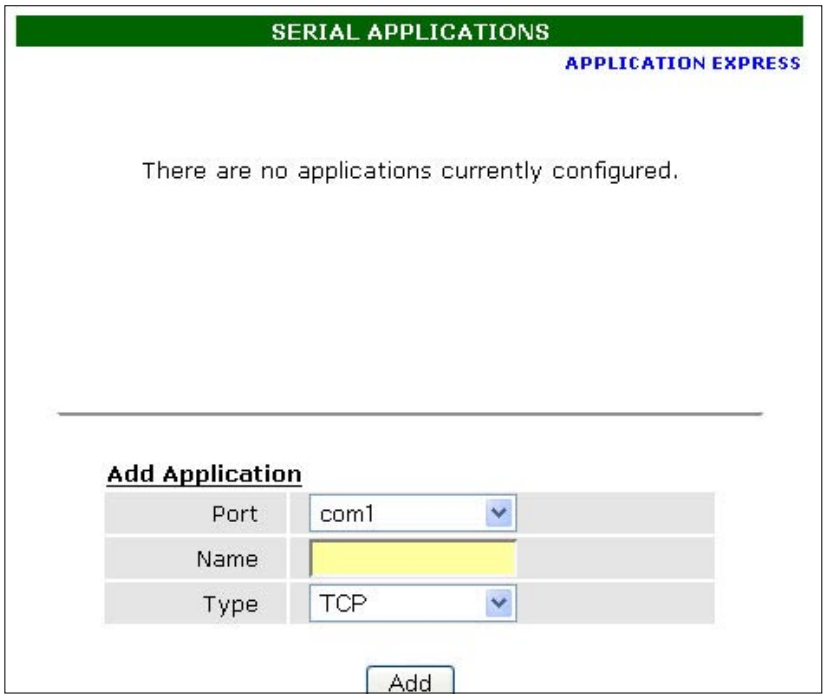
Protocol - Default is Raw.

Raw - no protocol is used. Data is streamed transparently through the PocketPAD.
TC500 - Burroughs TC500 Poll-Select.

Note:
If Flow Control is set to ***None***, a simple 3-wire Crossed Serial cable can be used instead of a Full Crossed Serial cable.

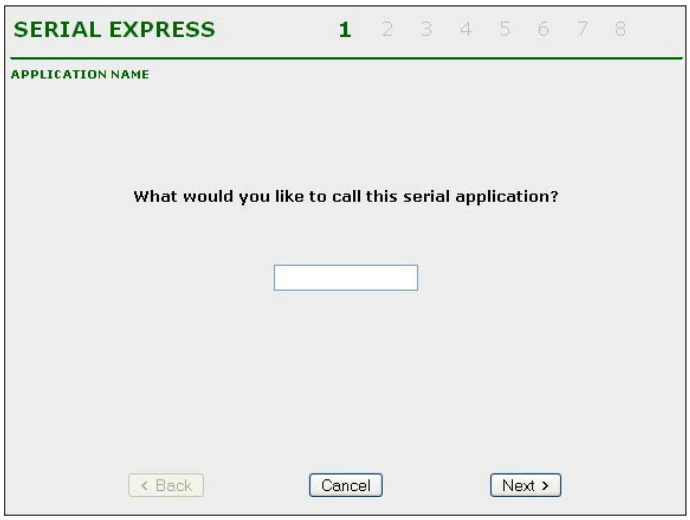
Applications

Setting up a Serial Application using ‘Application Express’



Opening ‘Serial, Applications’ in the menu bar will show you a list of currently configured applications. From here, click on the link labelled “Application Express” This will launch the wizard in a separate browser window as indicated below. The wizard will guide you through setting up a serial application. Depending on your environment, you will have the option of clicking through and in most cases use the default assigned values. The following steps below show how to set up a Passive serial application configured for port 5000 on COM1.

1.Application Name



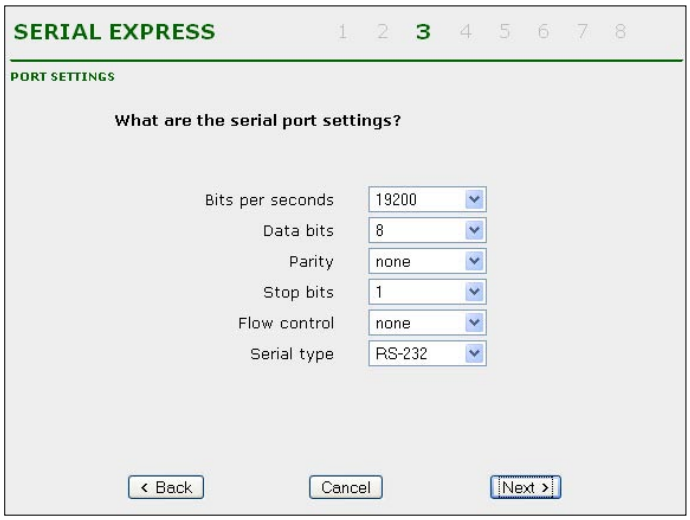
Enter a descriptive name which will be used to uniquely identify this serial application.

2.Serial Port

SERIAL EXPRESS
1 2 3 4 5 6 7 8
SERIAL PORT
To which port is the serial device attatched?
com1
Please note that configuring this application will remove all previously configured applications for this serial port.
< Back
Cancel
Next >

Select the serial port to which the serial device is connected.

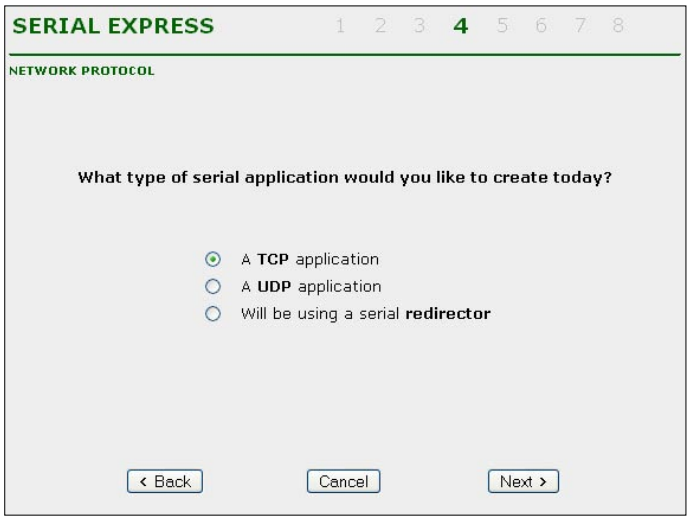
3.Port Settings



Enter the serial port settings.

Speed	-	Baud rate. Default is 19200 bits per second. Maximum is 230400.
Data Bits	-	Number of Data Bits. Default is 8.
Parity	-	Data Integrity method. Default is None. Other supported types are Odd, Even, Mark, and Space.
Stop Bits	-	Number of Stop Bits. Default is 1.
Flow Control	-	Type of handshaking. Default is None. Other supported types are Hardware (RTS/CTS) and Software (Xon/Xoff).
Serial Type	-	**RS-232** - connect a RS-232 cable to the Serial interface. **RS-422** - connect a RS-422 cable to the Serial interface. **RS-485** - connect a RS-485 cable to the Serial interface.

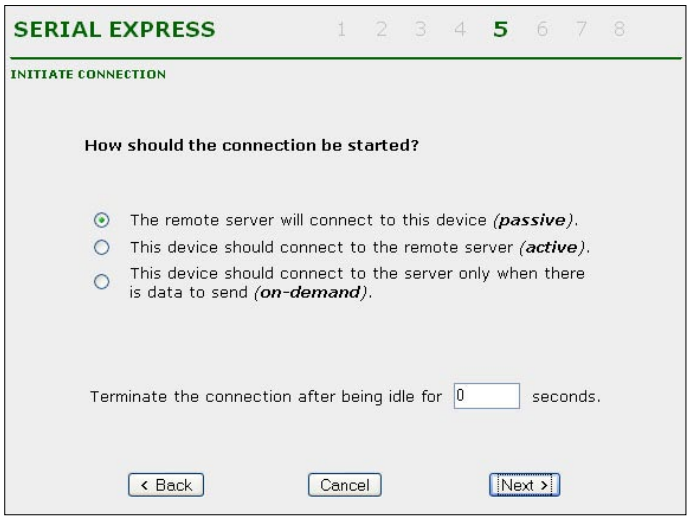
4.Network Protocol


SERIAL EXPRESS
1 2 3 4 5 6 7 8
NETWORK PROTOCOL
What type of serial application would you like to create today?
A TCP application
A UDP application
Will be using a serial redirector
< Back
Cancel
Next >

Select one of the following type of serial application would you like to create.

TCP Application	-	Communication between this device and the remote server will be done over TCP/IP. TCP guarantees reliable and in-order delivery of data.
UDP Application	-	Communication between this device and the remote server will be done over UDP/IP. UDP does not provide the reliability and ordering guarantees that TCP does, but is faster and more efficient for many lightweight or time-sensitive purposes.
Redirector	-	If you will be using a serial redirector (like Serial Anywhere) on the remote server choose this option. All communication will also be done over TCP/IP.

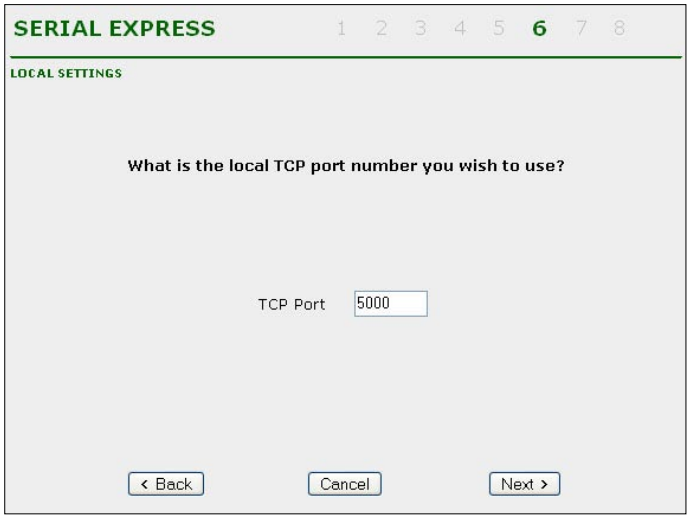
5.Initiate connection


SERIAL EXPRESS
1 2 3 4 5 6 7 8
INITIATE CONNECTION
How should the connection be started?
The remote server will connect to this device (passive).
This device should connect to the remote server (active).
This device should connect to the server only when there is data to send (on-demand).
Terminate the connection after being idle for 0 seconds.
< Back
Cancel
Next >

Choose from one of the following methods for starting a connection.

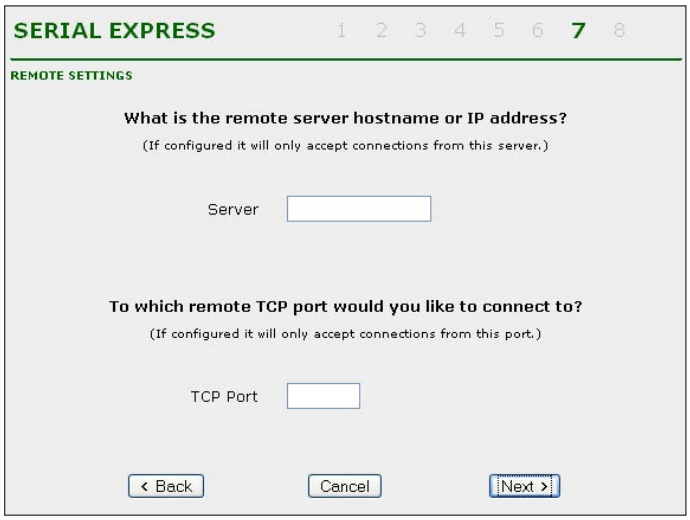
Passive	-	The application will wait for a connection from a server before data communication will start.
Active	-	An application will connect to the remote server at startup and will automatically reconnect should the connection be closed.
On-Demand	-	This device should connect to the server only when there is data to send.

6.Local Settings



Enter your local TCP port number. This is the local network port to be used for the application. For active/fixed applications this field is not compulsory, but can be used to fix the local port to be used; otherwise the application will automatically choose a port number.

7.Remote settings (Active applications)


SERIAL EXPRESS
1 2 3 4 5 6 7 8
REMOTE SETTINGS
What is the remote server hostname or IP address?
(If configured it will only accept connections from this server.)
Server
To which remote TCP port would you like to connect to?
(If configured it will only accept connections from this port.)
TCP Port
< Back
Cancel
Next >

The following settings could be set as a security feature to only allow connections from certain hosts and host ports. If you should wish to set this up, enter the remote server name and port number.

Server	-	This is the hostname or IP address of the remote server to connect to. For active/fixed applications this field is compulsory. For added security on passive/follow applications, if configured, it will only accept connections from the configured address.
TCP Port	-	This is the network port number on the remote server to connect to. For active/fixed applications this field is compulsory. For added security on passive/follow applications, if configured, it will only accept connections from the configured network port.

8.Update Configuration

SERIAL EXPRESS
1 2 3 4 5 6 7 8
You have now successfully completed the Serial Express setup.
Please click below to update the configuration.
Update Configuration
Have a nice day.

To complete the setup of your Serial application, click on ‘Update Configuration’. Take note of the colour change of the ‘Apply Changes’ option in your navigation menu. Your new settings will only become active once you click ‘Apply Changes’ and then ‘Save and Reboot with new Settings’

Configuration File Upload

To configure your Wireless Router using a configuration file, select your Router once you have scanned for devices using EtherPAD Explorer. Click [**Get configuration**] to obtain a copy of the Router's configuration file. This file can be modified and uploaded to give the Router new parameters using [**Set configuration**]. Rebooting the Router will make the changes active.

Monitoring and Support

This chapter provides information on the options available to monitor and support the Wireless Router.

Monitoring

PPP Connection

To monitor or control your PPP connection, opening ‘Monitoring, PPP Connection’ in the navigation bar will open one of two screens. For ‘Always-on’ dial-out connections, your active PPP connection will be displayed. If you chose ‘Manual Dial-out’ you will have the option from here to make your PPP link active.

An active PPP connection will display the following screen.

Connection Uptime	-	The time the current session has been alive for.
Maximum Bandwidth	-	The maximum available bandwidth in Bytes per second. Take note that this is not bits as usually rated on modems.

Transmit (TX) and Receive (RX) details are shown.

Bytes	-	shows the total data throughput in Bytes for the current session.
Total Packets	-	shows the total packet throughput during the current session.
Bytes/second	-	Rate of data flow at a given point in time. The value is an average of the last 10 seconds of actual data throughput.
Utilisation	-	Percentage of available bandwidth currently used as an average of the last 10 seconds.

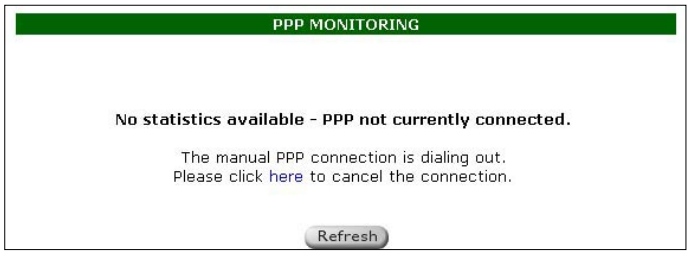
A graph indicates the traffic passing the PPP interface in the past 15 minutes.

Note:
To update the graph, click on ‘Refresh’ - or select the ‘Auto Update’ checkbox to refresh automatically every 10 seconds.

When connecting through the “Manual Dial-out’ option, or should you have made configuration errors when configuring PPP, opening ‘PPP Connection’ will display the following screen.

PPP MONITORING
No statistics available - PPP not currently connected.
The manual PPP connection has not been started.
Please click here to initiate the connection.

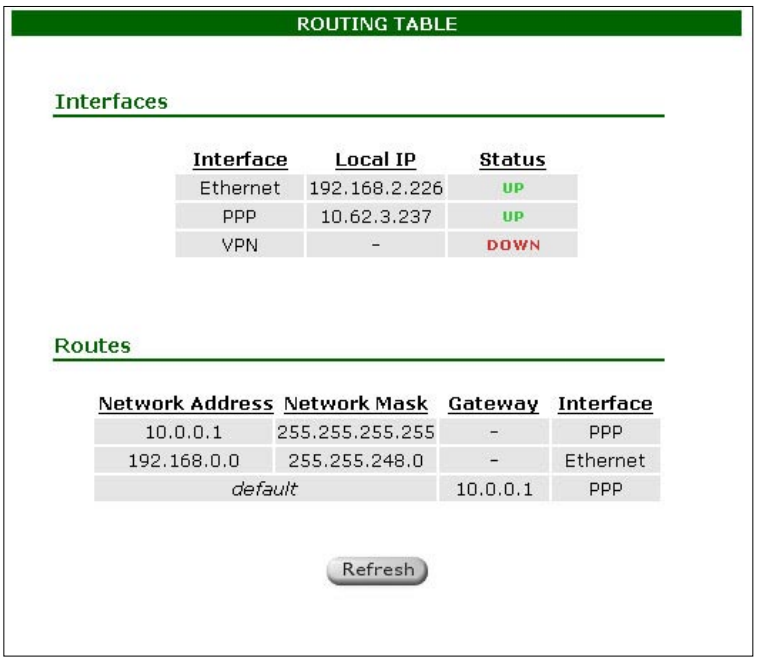
To initiate your PPP connections, click on the ‘click here’ link.


PPP MONITORING
No statistics available - PPP not currently connected.
The manual PPP connection is dialing out.
Please click here to cancel the connection.
Refresh

The Router will start the PPP connection and dial-out. Click on refresh to view your active PPP connection. You should see the screen as indicated on the previous page.

Routing Table

The Routing Table page displays a list of currently configured interfaces and associated IP adresses together with their status. This page also shows you an overview of your Routing configuration.



Interfaces

Interface - Displays the name of the interface.

Local IP - Displays the local IP of this interface.

Status - Indicates interface status. Up or Down.

Routes

Network Address - Indicates remote network's address for this route.

Network Mask - Indicates the remote network's network mask.

Gateway address- Indicates the IP address of the default gateway for this route.

Firewall Log

The Firewall will log activity as configured in your Firewall settings.

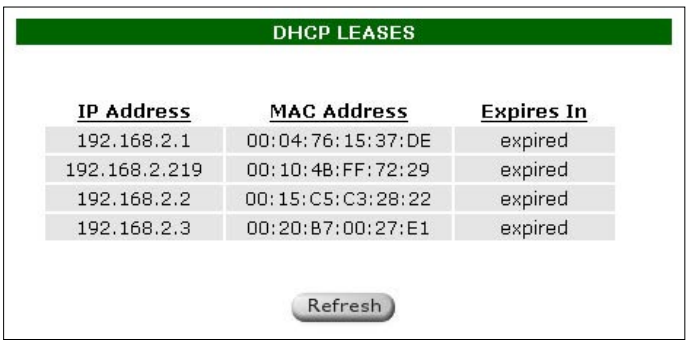
All packets matching any LOG rules configured in the Firewall will be displayed here.

```
Jan  1 00:00:08  Rule 1: SRC=192.168.2.225:80 -> DST=eth0:192.168.2.224:1054 PROTO=TCP
LEN=48 TOS=0x00
Previous messages repeated 7 times
Jan  1 00:00:09  Rule 1: SRC=192.168.2.225:80 -> DST=eth0:192.168.2.224:1055 PROTO=TCP
LEN=48 TOS=0x00
Previous messages repeated 5 times
Jan  1 00:00:09  Rule 1: SRC=192.168.2.225:80 -> DST=eth0:192.168.2.224:1056 PROTO=TCP
LEN=48 TOS=0x00
Previous messages repeated 5 times
Jan  1 01:02:15  Rule 1: SRC=192.168.2.225:80 -> DST=eth0:192.168.2.224:1414 PROTO=TCP
LEN=48 TOS=0x00
Previous messages repeated 5 times
Jan  1 01:02:15  Rule 1: SRC=192.168.2.225:80 -> DST=eth0:192.168.2.224:1415 PROTO=TCP
LEN=48 TOS=0x00
Previous messages repeated 17 times
Jan  1 01:08:03  Rule 1: SRC=192.168.2.225:80 -> DST=eth0:192.168.2.224:1449 PROTO=TCP
LEN=48 TOS=0x00
Previous messages repeated 5 times
Jan  1 01:08:03  Rule 1: SRC=192.168.2.225:80 -> DST=eth0:192.168.2.224:1450 PROTO=TCP
LEN=48 TOS=0x00
Previous messages repeated 17 times
Jan  1 01:08:04  Rule 1: SRC=192.168.2.225:80 -> DST=eth0:192.168.2.224:1451 PROTO=TCP
LEN=48 TOS=0x00
Previous messages repeated 6 times
```

Example of Firewall Log

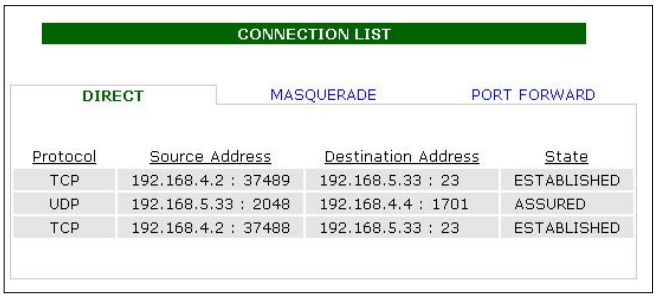
DHCP Server Log

The DHCP Server will log the DHCP activity and display current leases.



Connection List

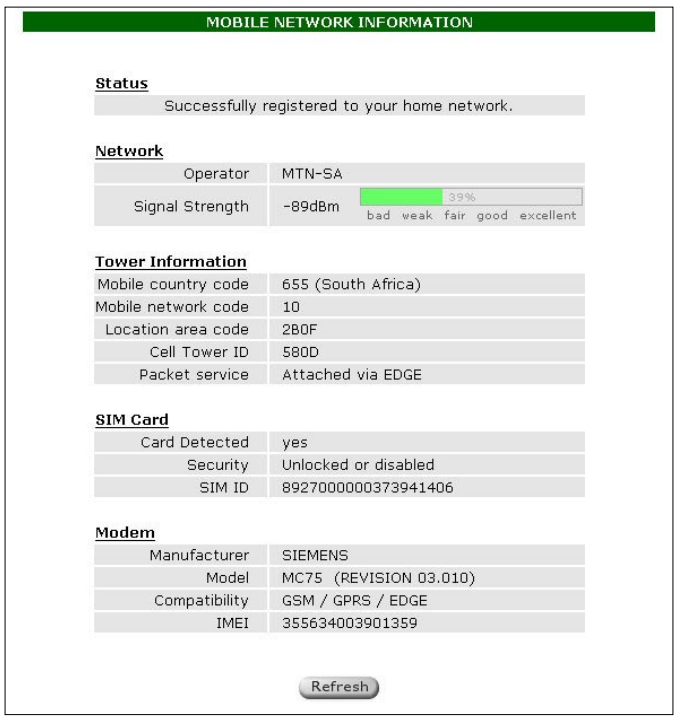
The connection list displays all current connections to the Wireless Router.



Direct	-	Displays a list of connections where no address translation is required.
Masquerade	-	Displays a list active PPP connections for which address translation has been implemented.
Port forward	-	Displays incoming connections for which port address translation is configured.

Mobile Network

The Mobile Network monitoring tool supplies you with various information about your GSM connection.



Status

Status will display the current status of your GSM connection. Please refer to the Troubleshooting chapter for more information and error codes.

Network

Operator	-	Displays the name of your GSM service provider.
Signal Strength	-	Displays signal strength at your current location.

Tower Information

Displays information about the GSM tower you are connected to.

SIM Card

Displays information about your SIM card.

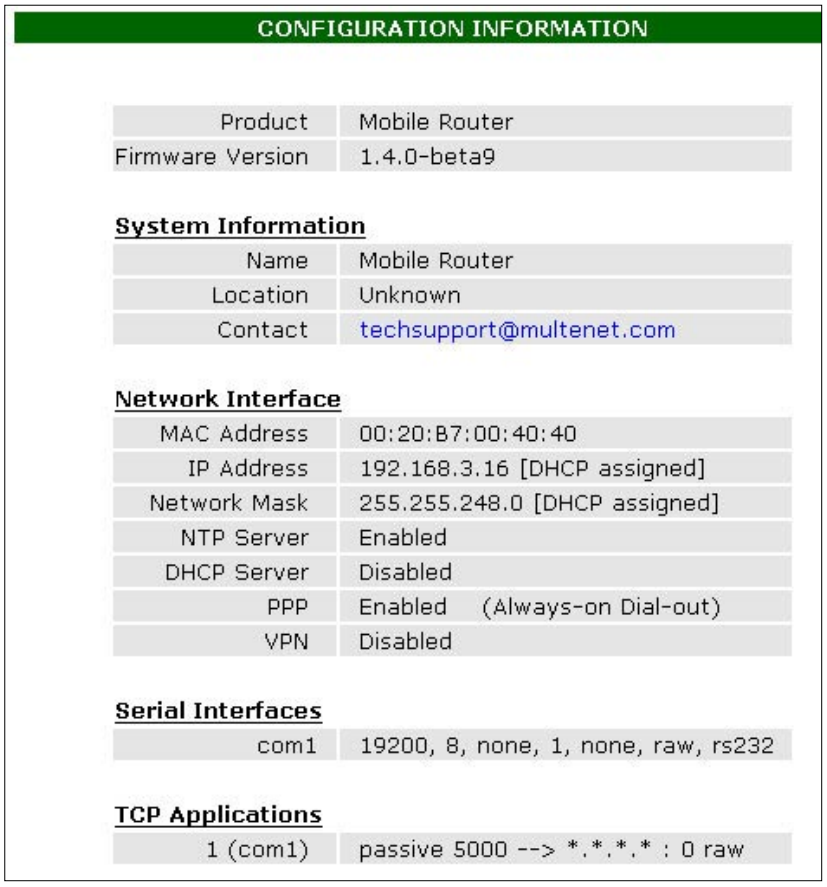
Modem

Displays information about your integrated GSM module.

Support

Config Info

To view information about current settings on the Router, opening ‘Support, Config Info” in the Navigation Bar will display the following configuration information.



CONFIGURATION INFORMATION

Product	Mobile Router
Firmware Version	1.4.0-beta9

System Information

Name	Mobile Router
Location	Unknown
Contact	techsupport@multenet.com

Network Interface

MAC Address	00:20:B7:00:40:40
IP Address	192.168.3.16 [DHCP assigned]
Network Mask	255.255.248.0 [DHCP assigned]
NTP Server	Enabled
DHCP Server	Disabled
PPP	Enabled (Always-on Dial-out)
VPN	Disabled

Serial Interfaces

com1	19200, 8, none, 1, none, raw, rs232

TCP Applications

1 (com1)	passive 5000 --> *.*.*.* : 0 raw

Product - Product Name
Firmware version - Current Firmware Version

System Information

Name - Assigned name
Location - Assigned Location
Contact - Assigned Technical Contact
MAC Address - Product MAC Address
IP Address - Current Assigned IP Address
Network Mask - Assigned Network Mask
NTP - Displays the state of the NTP service
DHCP Server - DHCP Server Status
PPP - PPP Status and connection type
VPN - VPN Status

Serial Interfaces

COM1 - COM1 Parameters

Config File

To view the current configuration file, opening ‘Support, Config File’ in the Navigation Bar will display the configuration file for your Wireless Router.

```
VERSION 1
‘|mngt|password’ = ‘xxx’
‘|mngt|sysname’ = ‘Wireless Router’
‘|mngt|location’ = ‘Unknown’
‘|mngt|contact’ = ‘techsupport@multenet.com’
‘|net|ether|eth0|ip’ = ‘0.0.0.0’
‘|net|ether|eth0|netmask’ = ‘0.0.0.0’
‘|net|ether|eth0|netlink’ = ‘autoselect’
‘|net|dns|dns1’ = ‘0.0.0.0’
‘|net|dns|dns2’ = ‘0.0.0.0’
‘|net|dns|dns3’ = ‘0.0.0.0’
CREATE ‘|net|snmp’ ‘1’
‘|net|snmp|1|mngr’ = ‘255.255.255.255’
‘|net|snmp|1|community’ = ‘public’
‘|net|snmp|1|access’ = ‘read only’
‘|net|snmp|1|trap’ = ‘disabled’
‘|net|ppp|type’ = ‘Always-on Dial-out’
‘|net|ppp|netip’ = ‘0.0.0.0’
‘|net|ppp|netmask’ = ‘0.0.0.0’
‘|net|ppp|localip’ = ‘0.0.0.0’
‘|net|ppp|remoteip’ = ‘0.0.0.0’
‘|net|ppp|apn’ = ‘internet’
‘|net|ppp|masq’ = ‘yes’
‘|net|ppp|authtype’ = ‘none’
‘|net|ppp|ousername’ = ‘’
‘|net|ppp|opassword’ = ‘’
‘|net|ppp|iusername’ = ‘’
‘|net|ppp|ipassword’ = ‘’
‘|net|ppp|telno’ = ‘*99***1#’
‘|net|ppp|idle’ = ‘3600’
‘|net|ppp|delay’ = ‘60’
‘|net|dhcp|eth0|enable’ = ‘no’
‘|net|dhcp|eth0|ipstart’ = ‘1’
‘|net|dhcp|eth0|ipstop’ = ‘254’
‘|net|dhcp|eth0|expire’ = ‘60’
‘|net|vpn|mode’ = ‘no’
‘|net|vpn|type’ = ‘PPTP’
‘|net|vpn|server’ = ‘0.0.0.0’
‘|net|vpn|tnet’ = ‘0.0.0.0’
‘|net|vpn|mask’ = ‘0.0.0.0’
```

Example of Configuration File

System Log

To view the Wireless Router's running System Log, open 'Support, System Log" in the Navigation Bar.

```
Apr 11 12:59:15 debug pppd[423]: Script /tmp/ppp/ppp0/ip-up finished (pid 432),
Apr 11 13:04:46 debug udhcpc[47]: Sending renew...
Apr 11 13:04:46 info udhcpc[47]: Lease of 192.168.3.16 obtained, lease time 3600
Apr 11 13:04:46 info configsvr: DHCP update occurred.
Apr 11 13:21:57 warn cellinfo: There are some problem registering to the mobile network.
Apr 11 13:21:57 info pppd[423]: Terminating on signal 15.
Apr 11 13:21:57 debug pppd[423]: Script /tmp/ppp/ppp0/ip-down started (pid 523)
Apr 11 13:21:57 debug pppd[423]: sent [LCP TermReq id=0x2 "User request"]
Apr 11 13:21:57 debug pppd[423]: rcvd [LCP TermAck id=0x2]
Apr 11 13:21:57 notice pppd[423]: Connection terminated.
Apr 11 13:21:57 info pppd[423]: Connect time 22.8 minutes.
Apr 11 13:21:57 info pppd[423]: Sent 54 bytes, received 54 bytes.
Apr 11 13:21:57 debug pppd[423]: Waiting for 1 child processes...
Apr 11 13:21:57 debug pppd[423]:   script /tmp/ppp/ppp0/ip-down, pid 523
Apr 11 13:21:57 debug pppd[423]: Script /tmp/ppp/ppp0/ip-down finished (pid 523), status =
Apr 11 13:21:57 info pppd[423]: Connect time 22.8 minutes.
Apr 11 13:21:57 info pppd[423]: Sent 54 bytes, received 54 bytes.
Apr 11 13:21:57 info pppd[423]: Exit.
Apr 11 13:21:57 info netmap: pppd exit: died because of failure [5]
Apr 11 13:22:03 warn cellinfo: Unable to detect the SIM card. Please insert or re-insert it.
Apr 11 13:34:47 debug udhcpc[47]: Sending renew...
Apr 11 13:34:47 info udhcpc[47]: Lease of 192.168.3.16 obtained, lease time 3600
Apr 11 13:34:47 info configsvr: DHCP update occurred.
Apr 11 14:04:49 debug udhcpc[47]: Sending renew...
Apr 11 14:38:21 info cellinfo: Successfully registered to your home network.
Apr 11 14:38:22 info dnsmasq[61]: using nameserver 192.168.1.1#53
```

Example of Running System Log

Contact Us

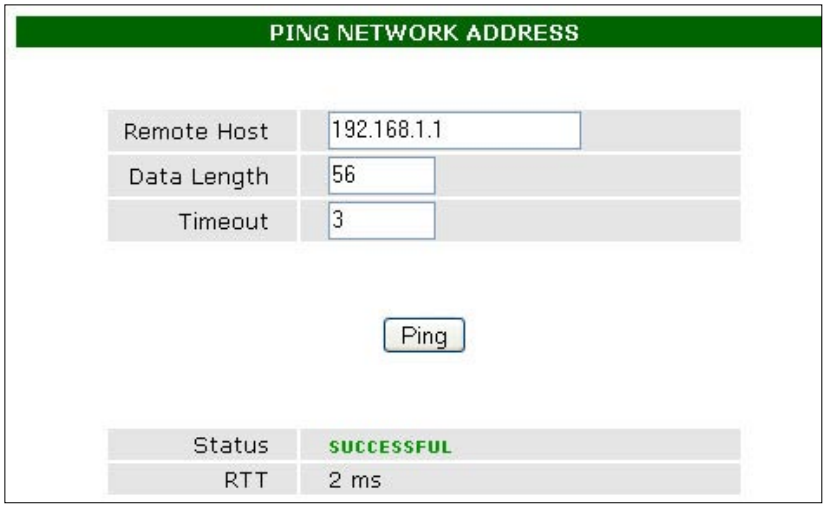
Should you need to contact Multenet with any queries, opening ‘Support, Contact Us’ in the navigation bar will display the following contact information.

Multenet Contact Information

Tools

Ping

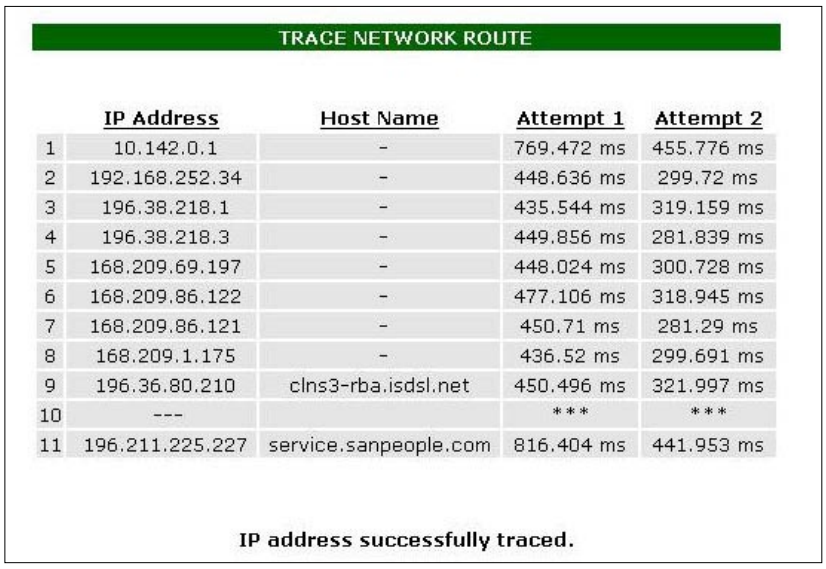
Ping a program used to test whether a particular network destination is online by sending an Internet control message protocol (ICMP) echo request and waiting for a response. (Also called packet internet gopher).



The Wireless Router's built in Ping utility allows you to ping network devices directly from the Wireless Router. To send a Ping, enter a address for the remote host and click on Ping.

Traceroute

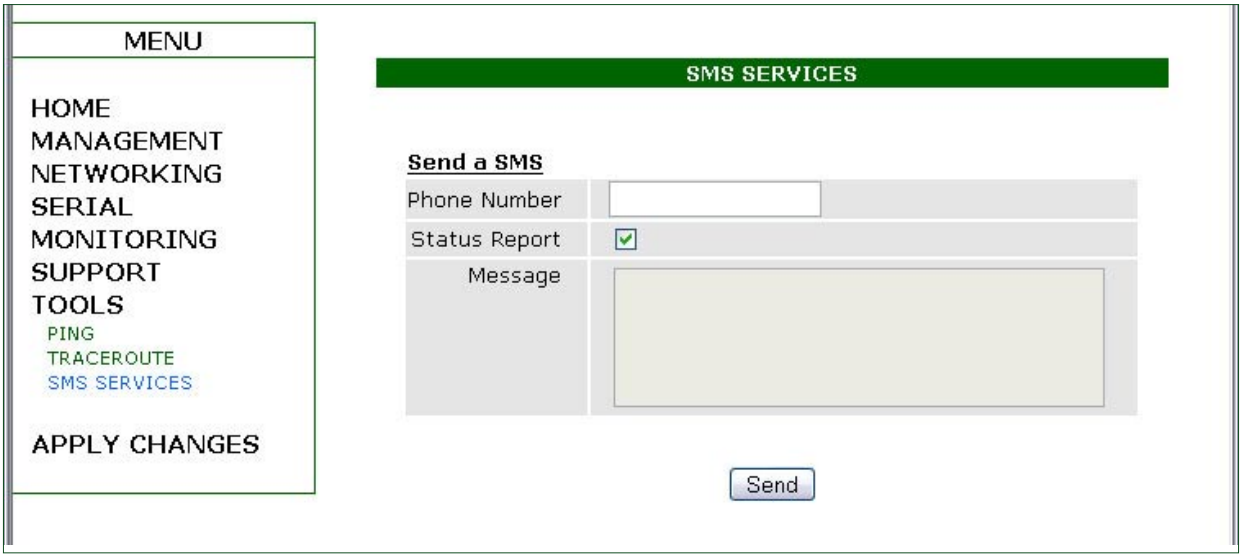
Traceroute is A TCP/IP protocol used to identify the components of the path between two machines and to identify the contribution of each component to the overall Round-Trip Time.



To start a trace, enter the address of the host you would like to do a traceroute to and click on Trace.

SMS Services

SMS Services allows you to send a current Status Report of the unit to a cell phone. This report allows for easy identification of the Wireless Router. The report includes information on which Service Provider the Router is currently connected to, the IMSI number of the SIM card in use as well as signal strength.



To send a Status Report, enter the intended recipient's telephone number in the field provided, ensure the 'Status Report' option is checked and then click on 'Send'.

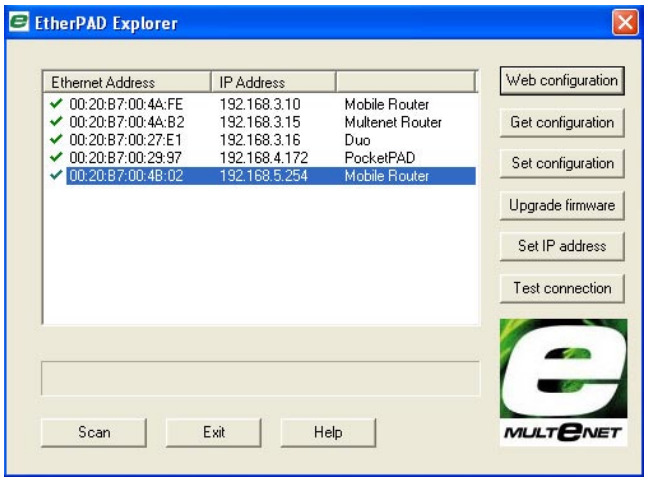
To send a SMS text message, enter the recipients number in the box provided, uncheck 'Status Report' and type your message in the 'Message' field.

UPGRADING

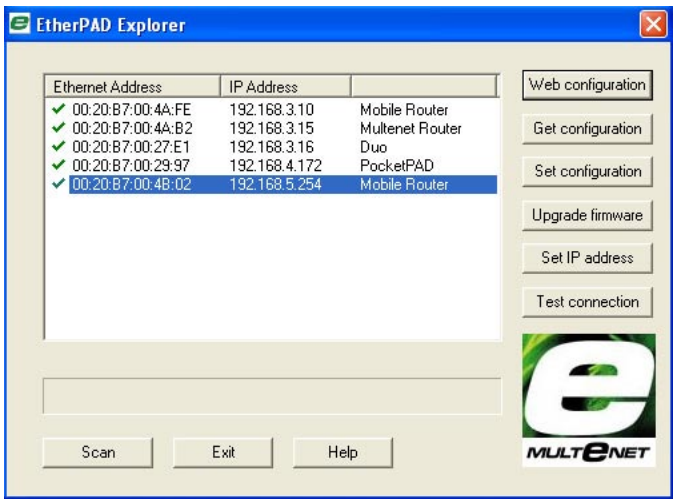
This chapter provides information on upgrading the firmware on your Wireless Router.

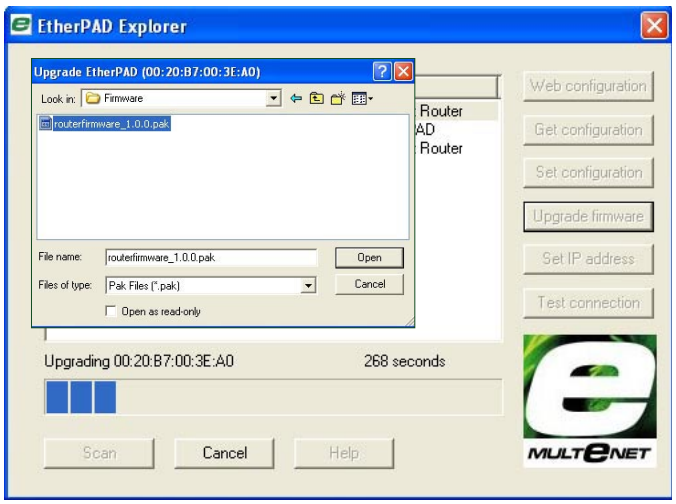
Firmware upgrade

To upgrade the Wireless Router Firmware, launch EtherPAD Explorer from the Multenet Product CD and select ‘Scan’ to search for attached Multenet devices.



Highlight the device you would like to upgrade firmware for and select ‘Upgrade Firmware’. EtherPAD Explorer will then prompt you for the file, which should be a ‘.pak’ file, for preforming the upgrade.





Browse to the directory in which you have stored your firmware and open the file to start the upgrade. EtherPAD Explorer will show a status bar informing you of the upgrade process. A pop up box will inform you whether the upgrade was successful once the operation completes.

TROUBLESHOOTING

This chapter briefly explains some troubleshooting methods to help diagnose problems connecting to your Wireless Router.

Verifying MAC Addresses

When the Router leaves the factory, the only address associated with it will be its universally unique Ethernet address. This is also referred to as the MAC (Media Access Control) address. The MAC address is programmed at the factory and cannot be modified. It is a 12-digit hexadecimal number and is printed on a bar-coded label on the side of the unit. Wireless Router MAC addresses currently begin with '**0020B7**'. In the unlikely event of the Router not having a MAC address programmed, the unit must be returned to Multenet for re-configuration.

Ping

Ping the Router to quickly verify that the device is reachable. Type the following from the Command Prompt.

A Reply reveals that the Router is reachable.

If you observe a ***Timeout***, there may be numerous reasons to this error. It could be a network disruption or a Router failure (e.g.. Power Outage). Take note of '**time**'. If latency is high, timeouts may occur during remote configuration or even 'expected' data throughput during normal operation.

For example: Your office network is flooded with data transactions during daylight hours (or your ISP peering links are congested at certain Peak hours). This results in links being very latent (slow). Protocol standards dictate timeout parameters which cause packets to be dropped if data acknowledgement doesn't happen in a set time.

ARP

Use the ARP command to check that the IP Address you set the Router to belongs to the Router. You may have configured the Router to the same IP Address as another device on the network. Ping the Router's IP Address as shown above.

From the Command Prompt, use the ARP command.

Contact your Network Administrator to investigate should there be any issues with duplicate IP Address assignments.

Traceroute

Perform a Traceroute towards your Router to obtain a snapshot of network routing. This is applicable to your PC being more than one hop away from the Router (i.e. not on the local segment or subnet).

There may be a number of reasons why you may find the Traceroute failing at certain points (from the ISP blocking ICMP packets, to incorrect routing, to physical line disruptions). An email to the ISP of the network which contains the problem or even an email to your Network Administrator will get some answers.

If the Traceroute results indicate the subnet in which your Router is in (or its Gateway IP), then it is possible that your Router is powered off/malfunctioned or there is a cable/switch/hub problem.

NOTE: MS Windows uses 'tracert'. Other OS' usually use 'traceroute'.

Telnet

Use the Telnet command to connect to the TCP port of your PocketPAD. You will observe data received from the connected serial device. You can send data to the serial device as well.

```
c:\>telnet 192.168.2.118 5000
```

If you are unable to connect to the configured port, check your Router settings. If you have made changes, you need to reboot the Router for it to take effect.

Check the Network Application settings. If '***Remote Host/IP Address***' (and/or '***Remote Port***') is configured, you will need to connect from that specific host (:port). If the '***Application Type***' is active, you won't be able to telnet to the port (set it to Passive to test). Try 'telnetting' to the Remote Host's port to check if it opens a socket.

```
c:\>telnet 192.168.2.118 5001
Connecting To 192.168.2.118...Could not open connection to the host,
 on port 5001.
No connection could be made because the target machine actively refused it.


c:\>
```

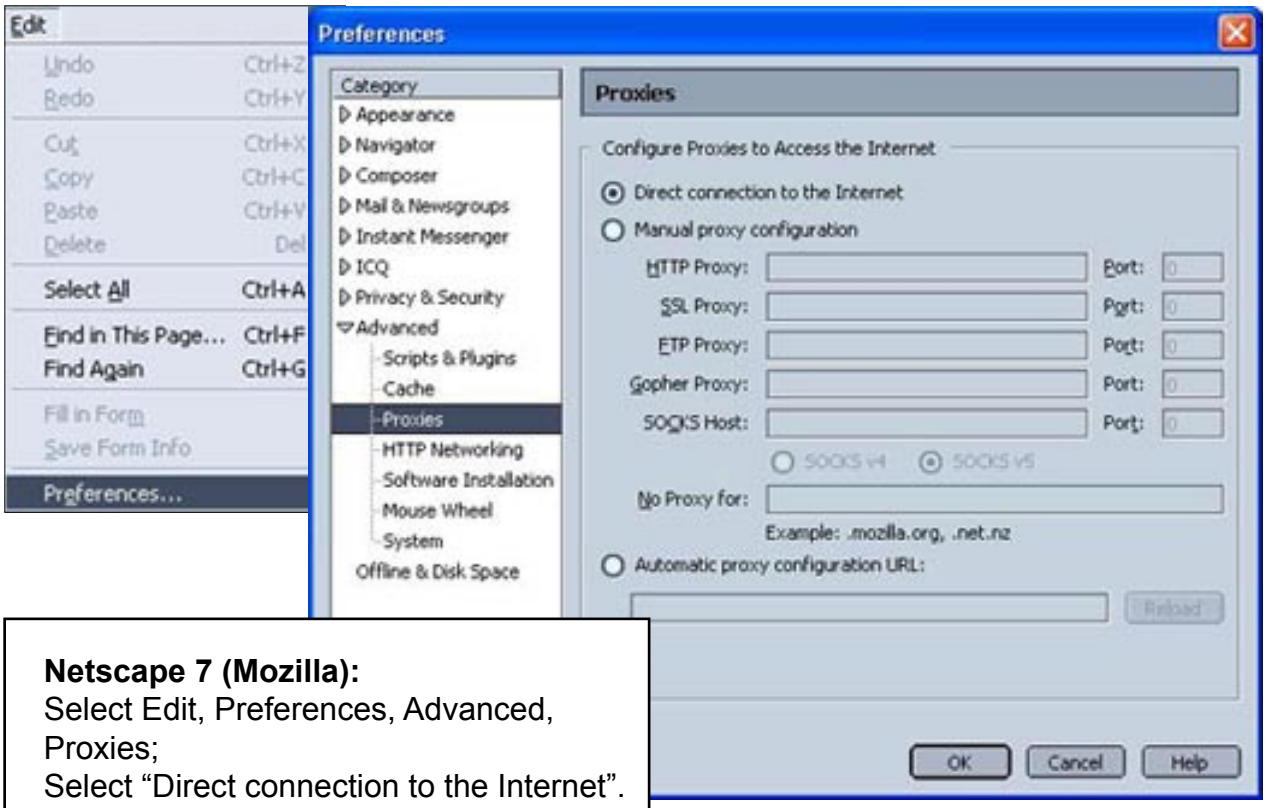
Error connecting to TCP port

How many hosts are connecting to each Network Application?
A maximum of 5 TCP and/or UDP network applications can be configured on the Router. Each application can handle 5 socket connections (Total of 25 concurrent socket connections at any one time with all applications configured as Passive).

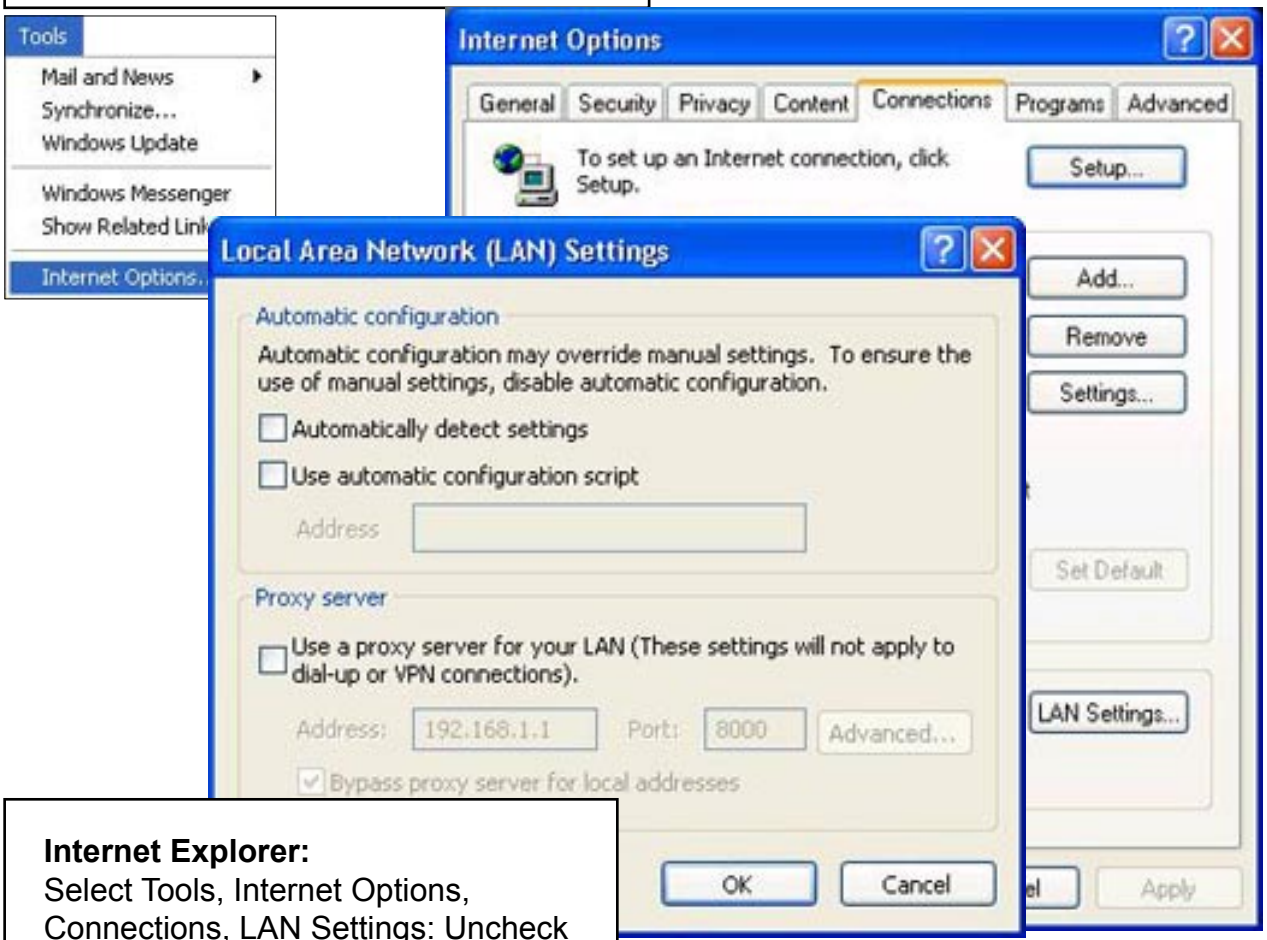
Web Browser Proxy Settings

Check your Browser Proxy settings should you be able to successfully Ping the Router, but are unable to connect to the Router's Web Configuration.

If the Proxy is enabled, traffic is directed outside the LAN to the internet via a gateway. If you cannot alter these Proxy settings, try using Telnet Configuration to alter the Router parameters.



Netscape 7 (Mozilla):
Select Edit, Preferences, Advanced, Proxies;
Select “Direct connection to the Internet”.



Internet Explorer:
Select Tools, Internet Options, Connections, LAN Settings: Uncheck the “Use a proxy server for your LAN” option.

Recovering from a Lost Password

Should you lose your Root password (default is ‘xxx’), you can recover from the fault by erasing the Dataflash. You will need to know the Bootloader password (default is ‘user’).

If both passwords are lost, you can send the unit back to Multenet for recovery (there is a cost associated with this recovery procedure).

Log into the Bootloader

Power recycle the Router. The LEDs will flash for a set time as configured by the Bootdelay variable (default is 20 seconds).

Connect a terminal session (e.g. Hyperterminal) to COM 1 of the Router. Serial parameters are 19200 baud rate, 8 data bits, 1 stop bit, no parity, no flow control.

While the LEDs are flashing, type the Bootloader password into the terminal session (default is ‘user’). Simply recycle power again if the LEDs have stopped flashing and no Menu has appeared after typing in the password.

Type ‘2’ (Upgrade Menu).

Type ‘5’ (Erase Dataflash). ‘y’ to confirm deletion.
The process will take a few minutes to complete and return to the Upgrade Menu.

Type ‘1’ (Change Upgrade Serial Speed) to match your serial line baud rate. The highest baud rate of (230400) is recommended for a faster upload of data.

Change your terminal session speed to the configured Upgrade Serial Speed setting.
‘Enter’ to continue once you have reconnected.

Transfer the Router firmware via ‘Kermit’. You can find the latest firmware on the Multenet website. Current or older firmware can be found on the CD shipped with the Router.

After the file upload, you will be prompted to set the baud rate back to 19200. The data will be checked and verified.

System

Heartbeat (HBT) - If this LED is permanently ON or OFF, the PocketPAD has failed and needs to be returned. The LED will be ON for some time (20 seconds) during its boot-up cycle.

Power (PWR) - Lights up when there is power to the Router. If this LED is OFF, check the Power Supply and its connections.

Serial Interface

Transmit (TX) - Lights up as data is sent to the serial interface. If you send data to a configured TCP/UDP port and do not see the TX LED flash, check your Router configuration.

Receive (RX) - Lights up as data is received from the serial interface. If data is received from the serial device, but does not get to your remote site, check your Router configuration. There may also be a problem with the network. Connect to the TCP/UDP port to check if data is received.

Network Interface - 10/100 Base-T

10/100 Base-T (10/100) - Lights up if network is 100Mbps. OFF is network is 10Mbps. Check if Autodetect is selected in the Router configuration.

Link/Activity (LNK/ACT) - This LED flashes as data is transmitted/received over the Ethernet interface (if your configured serial device sends/ receives data). It will also light up if any packets are sent to the interface, but are not destined for the serial device. If this LED is OFF, check the Ethernet cable and the switch/hub or PC that it is connected to. Remember: PC -> Crossed Ethernet cable; Switch/Hub -> Straight Ethernet cable.

GSM

Link (LNK) - Lights up when you have sucessfully registered to the mobile network.

Activity (ACT) - This LED flashes as data is transmitted/received over the GSM interface.

Mobile Network

There are a number of messages relating to the initiation of the GSM module, the SIM card and registration to your mobile network service provider. Below is a list of the messages for the various states, their cause and the resolutions to error messages.

Unable to communicate with the integrated GSM/GPRS modem.
Cycle the power to your Wireless Router. Should this problem persist, please contact Multenet Technical Support. techsupport@multenet.com

Unable to detect the SIM card. Please insert or re-insert it.
Insert or re-insert your SIM card into the device.

SIM security issue, a PIN is required to unlock the SIM card, please configure one.
The SIM card inserted requires a PIN to be unlocked. You need to configure a PIN as described in the Configuration chapter.

SIM security issue, a PUK is required to unblock the SIM card. Please replace the SIM
Remove the SIM card and unlock it with the correct PUK code.

Unable to detect the mobile network signal.
This indicates low or no reception. Try a different location for better reception.
This could also indicate that the cellular service is down.

Unable to attain current registration state
This should only be temporary while the Wireless Router is initializing. Please wait for a short while and try again.

There is a problem registering to the mobile network.
Wireless Router is between network searching states.

Searching for your mobile network.
The Wireless Router is still searching for the Network Provider as configured by your SIM card.

Registration was denied. This is a permanent error. Please try another SIM card.
This is usually seen with SIM cards that have been unregistered by the network provider.

APPENDIX

Reference pages for specifications and cable diagrams.

Wireless Routers

Datasheet

Technical Specification

Features

- Device network connectivity via UDP/IP and TCP/IP
- Device management via Web, Telnet, DHCP/TFTP, Serial,
- Windows configuration utility.
- Layer 3 routing
- PPP dial-in and dial-out connections with authentication (CHAP / PAP)
- SNMP v1, v2 (MINB-II) device monitoring
- DHCP Server / Client
- On-demand dialing available
- Configurable IP Firewall
- Masquerading (NAT)
- Port Forwarding
- VPN tunneling with data encryption (L2TP / PPTP)
- RTC with automatic time synchronization
- NTP Time Server
- Monitoring tools via web interface
- Firmware upgradeable via network (FTP) or serial
- Password Protection

Software Specification

- **Network Protocols:** TCP/IP, UDP/IP, BootP/DHCP, TFTP, ICMP, ARP, Proxy ARP, Telnet, FTP (client and server), HTTP, SMTP, DNS, PPP, SNMP (v1, v2), Redirector
- **Serial Protocols:** Raw, Redirector, TC500
- **Parity:** None, Even, Odd, Mark, Space
- **Flow control:** None, Hardware (RTS/CTS), Software (XON,XOFF)
- **Data Size:** 5,6,7,8
- **Stop bits:** 1,2
- Web Server
- Password Protection
- Firmware upgrade network or serial
- Multiple concurrent connections

Hardware Specification

- **Mobile:** Integrated Siemens MC75 GSM/GPRS/EDGE Modem
- **Broadband:** Integrated Novatel Wireless EU870D GSM / GPRS / EDGE / HSDPA / HSUPA Modem
- ARM 9 Processor
- 32MB RAM, 8MB Flash
- 10/100 Base-T Ethernet interface with Auto-Sensing and Auto MDI / MDX
- RS-232 / RS-422 / RS-485 Serial interface
- LED indication for Ethernet, GSM, Serial and Power
- Antenna

Physical Specification

- **Connectivity:** Ethernet (10/100 Base-T): RJ45, Serial Port (RS232/RS422/RS485): DB9 male
- **Enclosure:** Black anodized aluminium extrusion with stainless steal faceplate.
- **Dimensions:** 131mm x 105mm x 54mm
- **Weight:** 500g
- **Temperature Range Operating:** 0 degrees Celsius to 60 degrees Celsius
- **Temperature Range Storage:** -20 degrees Celcius to 85 degrees Celsius

Electrical Specification

- **Power Requirement:** 5W - 10V-30V DC or 10V-20V AC (Power Adaptor Available as an option)
- Power connector on front for DIN Rail PSU Connection

Standards Compliance

CE
RoHS
IEEE 802.2
IEEE 802.3
ICASA

Part Numbers

Mobile Router:	PROD0301
Broadband Router:	PROD0302
Power Adaptor: (220V):	PROD0925
DIN Rail Mounting Kit:	PROD0206
19” Rack Mounting Kit:	PROD0207

Contact Multenet

Phone:	27 (0) 21 882 8811
FAX:	27 (0) 21 882 8825
Email:	sales@multenet.com
Visit us:	The Vineyard Centre Cnr Adam Tas and Devon Valley Rd, Stellenbosch

Interface Pin-outs

Network Interface

The 10/100 Base-T interface is wired to a RJ-45 connector as follows:

Pin		Signal	Description
1	TX-	Out	Transmit Data –
2	TX+	Out	Transmit Data +
3	RX+	In	Receive Data +
4, 5	POE+	-	Power-Over-Ethernet +
6	RX-	In	Receive Data –
7, 8	POE-	-	Power-Over-Ethernet -

Wireless Router Network Interface Pin-out

RJ-45

Serial Interface

The Router's RS-232-C serial interface is wired to a 9-pin male D-shell connector as a DTE class device as follows:

Pin		Signal	Description
1	DCD	In	Data Carrier Detect
2	RxD	In	Receive Data
3	TxD-	Out	Transmit Data
4	DTR	Out	Data Terminal Ready
5	GND	-	Ground
6	DSR	In	Data Set Ready
7	RTS	Out	Request to Send
8	CTS	In	Clear to Send
9/9'	RI / POS	In / Out	Ring Indicator / Power Over Serial

Wireless Router RS-232 Serial Interface Pin-out

Pin		Signal	Description
3	Tx-/Rx-	Out	Data Negative
5	GND	-	Ground
7	Tx+/Rx+	Out	Data Positive

RS-485 Serial Interface Pin-out

Pin		Signal	Description
2	Rx-	In	Receive Data Negative
3	Tx-	Out	Transmit Data Negative
5	GND	-	Ground
7	Tx+	Out	Transmit Data Positive
8	Rx+	In	Receive Data Positive

RS-422 Serial Interface Pin-out

DB-9 Male

NOTE: Pin 9 can be used for Power-Over-Serial when selected via a jumper setting.

Cables

Crossed Serial Cable

In order for a computer (or other device) to communicate with the Router's RS232 serial port, a simple 3-wire crossed cable is usually sufficient. (If hardware-based handshaking is required then see Full Crossed Serial Cable.) The three wires should be connected as follows, using either a 9-pin or 25-pin connector for the computer's serial port.

PC 9-pin DB-F		PC 25-pin DB-F		Wireless Router 9-pin DB-M	
2	RD	3	RD	3	TD
3	TD	2	TD	2	RD
5	GND	7	GND	5	GND

Crossed Serial cable

Full Crossed Serial Cable

In order to connect the Router's RS232 serial port to another DTE class device (such as a computer) a simple Crossed Serial Cable is often sufficient. However, some applications may require the use of hardware-based flow control. Handshaking allows for higher data rates. In this case, a seven-wire cable should be connected as follows, using either a 9-pin or a 25-pin connector for the computer's serial port.

PC 9-pin DB-F		PC 25-pin DB-F		Wireless Router 9-pin DB-M	
2	RD	3	RD	3	TD
3	TD	2	TD	2	RD
4	DTR	20	DTR	6	DSR
5	GND	7	GND	5	GND
6	DSR	6	DSR	4	DTR
7	RTS	4	RTS	8	CTS
8	CTS	5	CTS	7	RTS

Full Crossed Serial cable

Null-Modem Crossed Serial Cable

When attempting to use a simple Crossed Serial Cable to connect a DTE class device (such as a computer) to the Router's RS232 serial port, some devices will not transmit any data unless their DSR and CTS signals are asserted. An easy way to fix this is to simply drive these signals using the device's own DTR signal. In this the three wires should be connected as follows, using either a 9-pin or 25-pin connector for the computer's serial port, and the indicated loops should be added.

PC 9-pin DB-F		**PC 25-pin DB-F**		**PocketPAD 9-pin DB-M**	
2	RD	3	RD	3	TD
3	TD	2	TD	2	RD
5	GND	7	GND	5	GND
4	DTR	20	DTR	┐	
6	DSR	6	DSR	┤ **: short**	
8	CTS	5	CTS	┤	
1	CD	8	CD	┘	

Null-Modem Crossed Serial cable

Straight Serial Cable

In order to connect the Router's RS232 serial port to a DCE class device (such as a modem) a straight serial cable should normally be used. In this case, a nine-wire cable should be connected as follows, using either a 9-pin or a 25-pin male connector for the DCE class device.

DCE 9-pin DB-M		**DCE 25-pin DB-M**		**Wireless Router 9-pin DB-M**	
1	CD	22	CD	1	CD
2	RD	3	RD	2	RD
3	TD	2	TD	3	TD
4	DTR	20	DTR	4	DTR
5	GND	7	GND	5	GND
6	DSR	6	DSR	6	DSR
7	RTS	4	RTS	7	RTS
8	CTS	5	CTS	8	CTS
9	RI	8	RI	9	RI

Straight Serial cable

NOTES

This device is developed and manufactured by MULTENET.

Copyright © 2008 MULTENET
All rights reserved.
This manual and any associated artwork, software, and product designs are copyrighted with all rights reserved. Under the copyright laws this manual, artwork, software, and product designs may not be copied, in whole or part, without the written consent of MULTENET. Under the law, copying includes translation to another language or format.

MULTENET
The Vineyard Centre, Adam Tas Road,
Stellenbosch, 7600

www.multenet.com